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USSR Report

TRANSPORTATION

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PROGRESS OF RYAZAN AIRPORT RECONSTRUCTION

Moscow VOZDUSHNYY TRANSPORT in Russian 31 Aug 85 p 3

[Article by VOZDUSHNYY TRANSPORT correspondent S. Tayns, Ryazan: "A Modern Harbor to Be"]

[Text] The Ryazan airport was not meeting the requirements of the times. The question about building a new one came up. But they weighed it and reached the conclusion that it would be expensive. Couldn't the old airport be rebuilt so that it would be like new? It turned out that this was possible.

The building, finished with tufa, gladdens the eye. The old forms have been ennobled and the interior has been renovated as much as was possible. The one-story plank buildings, where the subdivisions huddled, have been replaced. Now there is a tall modern building here, which has been turned over completely to the disposal of the summer staff. The methods-study classroom is well equipped as is the building for the summer subdivisions. The trouble was worth it.

Planning division chief A. Bulychev informed us that the five-year plan for treating agricultural areas was fulfilled ahead of schedule, on June 19th; more than 6 million hectares were treated from the air. To a considerable degree this was facilitated by a changeover to a new experimental planning, payroll and material-incentives system. Now the crews make their reports in terms of the physical hectares they have treated. The economic impact of the changeover to the new planning system has amounted to 61.4 thousand rubles.

The chief of the labor and wages division, Yu. Laykova, told us:

"Not only are the managers happy with the land and crop treatment, which has been done quickly and well, so are the pilots, who have started earning more. And the most important thing is this: the labor productivity growth indicator used to be on the level of 0.5 percent, but last year, in comparison with the corresponding period of 1983 for the airport, its growth amounted to 1.4 percent."

They decided to carry out the reconstruction without stopping work. But the airport personnel were unable to do the job with their own resources alone. They were helped by the oblast's main contract construction organizations.

Thus, Ryazanstroy took on the reconstruction of the landing strip and this fall the first five L-410's will shoot up into the sky after regular flights with Ryazan crews have been initiated.

Another contractor, Ryazanselstroy, is finishing the reconstruction of the fuel and lubricants storage area. The fuel tanks used to be arranged chaotically here, but now they are in two sections in straight rows. And they are linked in such a way as to make centralized fuel pumping outside the warehouse possible. Next door is a new fuel and lubricants laboratory, and with it there is no longer any need to take samples of fuel to Bykovo for analysis.

Ryazanoblkolkhozstroy is building a second floor onto the aerotechncial facilities building. A lot of attention is devoted to this service in the airport. From an old metal dock-hangar they wanted to tear down, the clever Ryazan people have made an engine repair shop with their own hands. Without touching the frame, they have made it warmer by lining the thin walls with brickwork and the ceiling with wood panelling. They have attached an electric telpher to the carrier beam. So that now everything is concentrated in one place and the labor is mechnanized. It is estimated that the new engine preinstallation shop will free five people because of mechanization. The economic impact of incorporating the shop into the complex will amount to 10.5 thousand rubles, and labor productivity will increase by 1.4 percent.

Today the Ryazan airport workers are busy building a garage for special motor transport vehicles and constructing an administration building for the aiport. But they will not stop with this. Their dream is to turn Ryazan airport into a modern air harbor for the oblast and to connect it with the most important industrial and cultural centers of the country.

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CIVIL AVIATION

'TRASSA' SYSTEM INTRODUCTION CAUSES VARIOUS PROBLEMS

Moscow VOZDUSHNYY TRANSPORT in Russian 31 Aug 85 p 3

[Article by VOZDUSHNYY TRANSPORT nonstaff correspondent T. Boyarskiy, under the rubric "Innovation Yield. Introduction Difficulties," "At the Finish Line of the Thorny 'Trassa'"]

[Text] Not much time has passed since the traffic service introduced the "Start" automatic air control system into operation. This has made it possible, without wasting time on conversations with crews, to get the extensive and varied information needed for making dispatching decisions. But the "Start" system lets the dispatcher see and hear only what is happening at close-range approaches to the airport. Given today's speeds and the traffic intensity of airplanes, this is not enough.

It should see, evaluate and analyze the air situation not only near the airport but at long-range approaches to it -- at a distance of at least a few hundred kilometers throughout the surrounding geographical area. And computer technology should tell it when each of the airplanes lit up on the blue screen should wait above this or that control point. A design was created for such a far-sighted (if radio specialists will permit me such an expression) system of selecting and processing information and given the name "Trassa."

The system is built on a new, specially created electronic apparatus connected by communication channels with remote radar sites, dispersed in various directions, and the coordination of all its multitude of elements turned out to be a very difficult task. Moreover in the process of performance testing, design shortcomings were revealed -- results of both the scientists, whose ideas were more or less realized in the project, not taking their work far enough, and errors by the manufacturing plant. This plant, in particular, gave inaccurate data to the designers regarding the heat release of the future electronic apparatus. As a result it turns out that the apparatus, once installed at each work station, will use no less than 1 kWh of electricity per hour. There are eight such work stations, and in the end the air conditioning equipment suggested to the designers turned out to be ineffective. Design changes and additional work were required. There were also such seemingly trivial things as the desk top of the dispatcher's work station. Representatives of the customer understand that the dispatcher has to work intensely at this desk a whole shift. And if the requirements of the science

of ergonomics are not observed, if the screens, microphones, tumblers, buttons, rheostats and switches are not arranged around the dispatcher in the most efficient way, he will work more slowly and will tire more quickly. Therefore the conclusions of the dispatcher are decisive; the table tops were carried off to the plant to be remade. Other discrepancies have occurred as well, as is always the case in the course of any performance testing. And it goes without saying in this regard that the designer tries to place the blame for his own faulty work on the customer while the manufacturing plant blames the users; the customer in his turn generates more and more new demands which, if I may use the terminology of electronics specialists, lead to an excited condition between representatives of the design and industrial organizations.

As a result of mutual complaints, discrepancies and contradictions over five months of performance testing, all the devices of the future system worked simultaneously and in coordination for only 14 days.

Worried by the endless squabbling, the airport party committee, on the initiative of its secretary B. Kornilov, invited representatives of party committees and buros from all organizations directly or indirectly connected with the design, creation, construction or future use of the system to its regularly scheduled meeting, including individuals living in Moscow, Minsk and other not too distant cities. A direct and frank exchange of opinions took place, sections were revealed which, if not today, tomorrow may threaten the USSR Government's prescribed deadline for turning over the new system for industrial operation, and decisions were taken directed at overcoming the difficulties that have arisen.

Chief of the radar complex of the "Trassa" system, engineer V. Yazvinskiy, himself appeared at the party committee meeting and listened attentively to the other participants. He feels that problems of reserving the basic elements of the future system were correctly raised and emphasized at the meeting, as well as problems of faulty construction work at one of the most remote radar sites where two radar stations interfere with one another and create mutual disturbances and darkened areas on the screens. In the end, the customer should receive a dependable item without disruptions or malfunctions, which will not have to be switched off every day for repair and adjustment, an apparatus that sees, hears and registers all objects in the air at a radius of its activity and on which it will be easy and pleasant to work. The party committee did not consider these demands to be extreme, and the deadline for turning the system over for operation -- USSR Constitution Day -- was not considered unrealistic. The deadlines for all intermediate results were scheduled to be met and checked. Two of the most central people with a vital interest in seeing that the "Trassa" system is finished by the deadline are the pilot and the traffic service dispatcher, while behind them is a third, invisible but even more important person, in whose interests all this is being undertaken. This is the air passenger. At the time when he is just heading for the ticket counter, many hundreds of specialists are working on making his flight convenient, not too lengthy, comfortable and safe.

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CIVIL AVIATION

AVIAREMONT'S EFFORTS TO INTRODUCE LASER TECHNOLOGY

Moscow VOZDUSHNYY TRANSPORT in Russian 17 Sep 85 p 3

[Article by VOZDUSHNYY TRANSPORT correspondent Yu. Kolesnikov, Irkutsk, under the rubric "To Guard the National Property," "The Laser Seeks a Path. An Innovation's Yield"]

> [Text] At the April (1985) Plenum of the CPSU Central Committee and the July party Central Committee meeting there were discussions about accelerating economic development by extensive introduction of the achievements of science, modern technology and technological processes in production, to ensure the rapid growth of labor productivity and reduction of all kinds of expenditures. Party documents especially point out the intolerability of excessive attention to form, bureaucracy and red tape in this important matter.

Chief of the mechanization and automation division, Gennadiy Alekseevich Vzyatkin, is showing various aviation equipment parts worked by laser:

"Here is a valve from an An-2 airplane engine. Worn chamfers. It costs 15 rubles. A dual elastic pinion for a gas distributer. Teeth are chipped: 30 rubles. The suspension from an An-24 chassis. Surface abrasion. State price is 17 rubles 50 kopecks. And so forth and so on. The usual products list of aircraft constructions with the usual defects after a certain period of operation. Today all such parts go for scrap metal. But they could still serve people. Rebuilding each of these costs only a ruble. Do you see the difference?"

Once, about 6 years ago, after evaluating all the advantages of laser metal working, specialists from Irkutsk began an ardent defense of the new technology and during these years they have noticeably approached their target of introducing the laser in production.

We know that the cost of repairing various kinds and types of equipment, including aircraft equipment, amounts to 15-50 percent of its value. The main portion of production repair costs -- 50 percent and more -- is made up of expenditures for spare parts. Consequently, the decrease in expenditures for spare parts, brought about when formerly used parts are rebuilt, promises to

make an enormous difference. Here is only one example. Rebuilding a valve-knob chamfer for an ASh-62IR (An-2 airplane) engine by laser-surfacing method will make an annual economic impact of about 50 thousand rubles. This is only one part out of hundreds!

A year ago, or more exactly on October 9, 1984, civil aviation plants No 31 (Moscow) and No 85 (Riga) were made responsible for preparing the first models of the LOK-3M laser, by assignment from the All-Union Aviaremont Association. Plant No 403 in Irkutsk was assigned to organize a section on laser technology.

The people of Irkutsk, the initiators of the new project, finally felt firm ground under their feet. On their order, the Novosibirsk Institute of Exact and Applied Mechanics of the Siberian division of the USSR Academy of Sciences delivered the technical specifications to the plant and began to help in the process of manufacturing the laser and work out the technology. Plant No 403 enterred into a contract with a number of local enterprises to collaborate in the area of studying and introducing laser technology. These organizations all belong to different ministries. The Irkutsk affiliated branch of KIIGA [Kiev Institute of Civil Aviation Engineers], the Irkutsk industrial tekhnikum and even...the Moscow Higher Technical School imeni N. E. Bauman all lent a helping hand.

All these organization, enterprises and educational institutions reacted enthusiastically to the needs of the aircraft repair plant. They helped with specifications and materials, and put their own laboratories at the disposal of the Irkutsk people. The Promstroyproyekt Institute, using its own internal funds, prepared a design for the building (it is already being constructed) for the section on rebuilding aircraft equipment by laser surfacing.

But what about plants No 31 and 85, whose responsibility included manufacturing the energy unit and module? Unfortunately, neither enterprise, though they seem the closest and most interested in the manufacture of the mentioned product, is in a hurry to begin the task.

For example, here is what the director of plant No 85, P. Lazarenko, answered to the Irkutsk people's request back in May of this year.

"I must inform you that the production plan for 1985 is fully committed in terms of volume and labor input. There are no resources for further production... To fulfil our assignment for manufacturing 4 modules of the LOK-3M laser for civil aviation plant No 403, with a labor input of 80 thousand norm-hours, does not appear possible without serious adjustment in the production plan."

An unhappy business. Maybe the Aviaremont order came out at the wrong time and without enough substantiation?

Economic development plans of the Ministry of Civil Aviation provide for a decrease in expenditures on spare parts in the sum of more than 100 million rubles and a parts-rebuilding volume of up to 2 million units a year, which will make it possible for up to 6 thousand people in industry to be freed, and

for up to 30 thousand tons of expensive metal to be saved. Obviously, one cannot manage here without persistence, energetic activity and a feeling for innovation.

While correspondence continues between the Aviaremont enterprises, plant No 403 has found for itself what seems to be a more serious contractor in the Angarsk administration of the All-Union Soyuzavtomatstrov Scientific Production Association. The people of Angarsk have been assigned, rather they have proposed themselves, to manufacture two LOK-3M lasers by the end of the year. Work is already under way. But this in no way means that plants No 31 and 85 can stand aside. We are talking not about a few experimental models but about the large-scale introduction of laser technology in all of the sector's enterprises. And plant No 403 is ready to take on itself the practical side of the matter as a base enterprise for disseminating the advanced method.

In this it needs help.

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MOTOR VEHICLES AND HIGHWAYS

'OKA' 2-CYLINDER SUBCOMPACT UNVEILED

Moscow IZVESTIYA in Russian 21 Jul 85 p 6

[Article by IZVESTIYA special correspondent A. Blokhnin: "Oka in the Zhiguli Family"]

> [Text] A decision has been adopted on organizing the output of light motor vehicles of particularly small class (weighing up to 650 kg). Production and assembly of these vehicles has been assigned on the basis of cooperation to three enterprises --the Volga Motor Vehicle Works, the KamAZ [Kama Motor Vehicle Works] and the Serpukhov Engine Works. The subcompact is indebted to the latter, particularly with regard to its name--Oka.

We have been waiting to see a motor vehicle like this for a long time. The first Zaporozhets, which was produced in the latter fifties, would seem like a large vehicle next to the small Oka. Motor vehicle drivers with a long record of service remember quite a few ironical remarks uttered during the first years of acquaintance with the Zaporozhets, precisely because of its unusually small size.

Although our streets are now filled with the omnipresent Zhiguli, the recollections of the first domestic subcompact are good: first of all, it was cheaper than other motor vehicles. The Oka, which is being readied to be placed on the conveyor, also promises to be the same.

The small, nimble motor vehicle of olive-green color deftly squeezes between the Volga, Moskvich and Zhiguli vehicles, several rows of which have occupied the entire parking area near the building of the Ministry of the Automotive Industry. Test driver Nikolay Zhdanov gave me brief instructions and familiarized me with the features of the new vehicle before yielding his place behind the steering wheel. The engine, more accurately "half" (two-cylinder) of the VAZ-2108 engine, is positioned sideways in the engine compartment: the vehicle has a front wheel drive. But this does not exhaust the innovations under the hood. A spare wheel was moved here (like in Niva). The battery was reduced in size but retained its former capacity. I ask: Was this made especially for Oka? No, it turns out that new, lighter batteries will be provided to all vehicles of the Volga Motor Vehicle Works.

Designers of the new subcompact strived to utilize the unified components of the series produced VAZ [Volga Motor Vehicle Works] vehicles to the maximum. In this sense, the Oka engine has adopted much from the "numeral 8," which was recently placed on the conveyor. It has a non-contact electronic ignition system and a toothed belt instead of a chain in the valve gear drive.

However, I couldn't wait to try the vehicle in motion as quickly as possible. Nikolay gave me the ignition key. One has to become adapted to any unfamiliar motor vehicle. It is good when an open asphalted space of a highway or an enclosed test track lies ahead. But here it was the exact center of Moscow, a multilane crowd of vehicles.

A turn of the key and the vehicle responds with a light hum of an engine come to life. The cabin has much that is familiar when compared with the Zhiguli: the instrument panel (admittedly, smaller and somewhat different in appearance, which resembles VAZ-2101) and door handles. Something should be said particularly about the doors. There are three of them altogether--two side doors and one rear door. The side doors are wide enough to ensure convenient boarding not only on the front seats but on the rear seats as well. The Oka can accommodate a total of four persons. Installation of a swivel driver's seat is envisaged in the version with manual control, which will create additional conveniences for invalids.

The crowded conditions of Moscow side streets did not allow evaluation of the small car's speed for a long time. Well, finally the Oka comes to a standstill near a stop sign, like at a starting line. A green light! Taking advantage of the uncrowded asphalted space, I give full gas to the vehicle. The Oka rapidly accelerates (this sensation is strengthened by the low fit and the size of the motor vehicle). The impressive Volga vehicles are left behind. Only the Zhiguli, whose drivers are clearly fascinated by the contest with the small stranger, are speeding alongside.

"The dynamics of the vehicle," said I. Korovkin, chief of the Passenger Motor Vehicle Department of the NAMI [Central Motor Vehicle and Engine Scientific Research Institute], who accompanied the Oka on this unusual road test, "were calculated in such a manner so that it would be 'competitive' against modern high-speed motor vehicles." The subcompact possesses an enviable degree of economy: controlled fuel expenditure per 100 km of track is no more than 3.5-4 liters and maximum operational expenditure under city driving conditions is up to 6 liters. The experience of foreign firms, which produce vehicles of a similar type, indicates that such models usually stay on a conveyor almost without changes for dozens of years. In this plan the Oka has a great reserve of newness with regard to design as well as technical solutions.

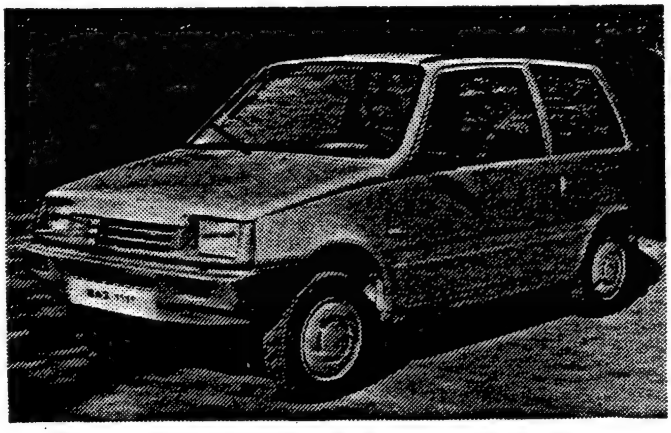
But how does a passenger riding in the rear seat feel? I ask Nikolay Zhdanov to take his regular place behind the steering wheel. Taking advantage of the stop, I again attentively examine the small car which afforded such pleasure. Black triangular strips of rubber extend along the edges of the roof. Joint welds are under them. (The design of the vehicle body was developed by taking into

account its assembly with the aid of welding robots). The black lines of rubber overlay as if increase the length of the vehicle visually, giving it a swift appearance.

The lower part of fenders and doors is covered with a black synthetic film, which is firmly secured to metal. Once again, esthetics and function: the film reliably protects areas which are most vulnerable to corrosion. "Details and features" such as these are also interesting: the windshield, which is installed for better aerodynamics at a great slant, is cleaned with one wiper and despite the maximum compactness of the vehicle, designers found a place for a small trunk behind the back of the rear seat. However, when it is necessary to haul something big (a television set, a washing machine), it also can be done by folding the back of the rear seat forward.

So, we are on our way again. In order to get to the seat behind the driver, one lightly presses on a convenient lever and the back of the seat falls forward. Of course, it is more cramped in the rear seat, but short trips will also not be tiring for passengers sitting in the rear.

The output of Oka, which is scheduled in the 12th Five-Year Plan, is planned in several modifications: with maximum simplied inside trimming (the cheapest version), a "de luxe" model and a manual control version.



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MOTOR VEHICLES AND HIGHWAYS

VAZ WORKS MODERNIZATION EFFORTS

Moscow PRAVDA in Russian 12 Aug 85 p 2

[Article by V. Shalgunov, PRAVDA correspondent: "VAZ Sets the Tone"]

[Text] Togliatti, Kuybyshev Oblast--The new VAZ [Volga Motor Vehicle Works] compact car immediately stands out in the flow of vehicles on the highway--the eye is still not used to its streamlined wedge-shaped form. But the quick little Oka is already running on the plant's testing track--it is being readied for production. The AvtoVAZ association collective, acting with initiative to accelerate scientific-technical progress and increase the efficiency of production in the 12th Five-Year Plan, has taken on the responsibility of renovating and modernizing all current products and reducing production preparation of basic models from eight to five years.

Vitaliy Stepanovich Strebelev, who has worked at the plant from the moment of its founding, compares the VAZ of yesterday to that of today.

"Here is an example for you," he says, "We made front brake cylinders for the first VAZ model. And there were six of us adjusters. Now I service the line alone. Reliable equipment, electronic control, high precision--it's an entirely different class! But it is necessary to catch up with the times again. In a letter to the central committee of the party, the association collective substantiated its responsibilities and named reserves. And now what is most important? That everyone realize that he is responsible for his own place. I myself, for example, am racking my brains over the automatic loading of the line. I figure that when the design is finished the operator will become superfluous--I will manage alone. And my comrades are doing the same--everyone is trying to make a personal contribution to the common cause."

It is precisely on the worker's duty and the economic calculation that has been thought out that the initiative of the VAZ workers, which has been taken up by many workers' collectives, is based. In the coming five-year plan the association has undertaken to increase production by 150 million rubles over the scheduled quota.

Today the most remarkable feature of the industrial life of VAZ is novelty. The primary strategic trend is retooling shops and sections. Not long ago a robot

technical complex was put into operation in the body assembly welding shop, and adjustment of the newest high productivity equipment is going on in the mechanized assembly block. And everywhere machines, lines and positioners have been made by the VAZ workers' own hands.

In the service department block we were able to see the new generation of plant robots. They can "work" as welding operators, loaders, painters and inspectors. P. Radayev, foreman of the fitters, at once turned over the latest "new arrival" for testing.

"In the manufacture, a robot is more complicated than a motor vehicle," related Pavel Aleksandrovich. "And there are particular reliability requirements: 10,000 hours of breakdown-free operation is the minimum. Our brigade is only two years old, but we mastered the business quickly and guarantee quality."

The annual production rate of the VAZ robot equipment has already exceeded 1000 articles. It has now been decided to increase the volume of VAZ machine-tool production 1.8-fold. Over the course of the five-year plan 6500 positioners, more than 930 welding robots and 75 automatic lines will be produced. All this will allow a significant reduction in hand labor, an increase in the number of sectors with totally automated production and a doubling in the rate of replacement of obsolete equipment.

The reconstruction has economic corroboration also. The production development fund developed by the motor vehicle plant workers will go toward modernizing and broadening production, automation and mechanization, and set up, adjustment, and research operations. This is helped by assignment to the association's funds of 40 percent of the money obtained from the export of motor vehicles.

The results of a competition during the first six months were recently discussed in the VAZ party committee. Plant personnel are coping successfully with their obligations for the concluding year of the five-year plan. Over-the-plan output of goods for cultural-welfare and economic purposes and of robots is higher than the projected level. About 4000 tons of rolled metal products, more than 400,000 cubic meters of natural gas, 57,000 gigacalories of heat have been saved, and technical retooling allowed about 100 workers to be liberated.

The present year has been like a rehearsal for the upcoming intensification of the savings regime. Now the entire increase in production is to be guaranteed, since the absolute number of workers will have been reduced by 1300 people in comparison with today's level. Thanks to the developments of designers and technologists, metal consumption for each vehicle is being reduced by 80 kilograms, and each vehicle's guaranteed lifespan will be increased by 1.5-fold. A 10 percent reduction in average fuel consumption is projected for all types of vehicles produced.

Independence, self-repayment and operation on a self-supporting basis provide broad-based opportunities for motor vehicle plant workers. In order to utilize them fully, it is necessary to learn to operate in a new way. The essence of the experiment is becoming the basis for any type of training. Plant economists are trying to bring its principles to every worker and engineer and searching for ways to increase the stake of VAZ workers in the end results of their labor.

"Right now in the collective there are especially many suggestions aimed at improving business," relates Yu. Karnaukhov, VAZ party committee secretary. "People know--now we will build housing, clubs, schools and kindergartens with the money we have made, without having to wait for them from the state budget. This means that the more profit the association makes, the greater will be the welfare of every family. There is a direct correlation here."

Contributions to the VAZ fund for social-cultural measures and housing construction are considerable--19.5 percent of profits. They will go not only toward new construction, but also toward medical equipment, sporting goods, trips for workers' rest and recuperation, cafeteria subsidies and toward keeping the entire city economy in order. That is why the association collective decided to make 30 million rubles more profit than the projected figures for the five-year plan.

The merging of the interests of the state, the collective and the individual is a powerful means of accelerating the development of production. The example and experience of VAZ, which support this, carry all new labor collectives along the path toward the mastery of new management methods and scientific-technical progress.

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MOTOR VEHICLES AND HIGHWAYS

CHRONOLOGY OF VAZ-2108 PROJECT DEVELOPMENT

Moscow ZA RULEM in Russian No 8, Aug 85 pp 5-6

[Article by A. Miller and V. Pashko, engineers for the VAZ [Volga Motor Vehicle Works] UGK [Office of the Chief Designer]: "The VAZ-2108--A History of its Development"]

[Text] Specialists at the Volga Motor Vehicle Works took the first steps toward the development of front wheel drive vehicles at the very beginning of its existence. Developed under a system of initiative, these operations had as their goal the development of an improved model of an especially small class, the demand for which is great in our country. In perspective, the orientation toward front wheel drive design required a certain amount of boldness under the conditions that prevailed when production preparation for the VAZ-2108 was in full swing. Nevertheless, the office of the chief designer of VAZ considered it necessary, along with the solution of ongoing tasks, to begin work on a fundamentally new vehicle.

By that time a number of western European firms, including Fiat, had already produced front wheel drive vehicles. VAZ specialists took advantage of every opportunity to obtain the most complete information possible. Along with the results of certain experimental operations that had already been carried out in domestic industry, this was the initial material for work in a new direction.

The first front wheel drive prototype, the VAZ-1E-1101, was manufactured in the autumn of 1971. Its power-generating set was arranged transversely on the vehicle and was laid out along the so-called successive scheme: the gear box drive shaft in alignment with the crankshaft. The 1000-cubic centimeter four-cylinder water cooled engine had a capacity of 45 horsepower. The mass of the VAZ-1E-1101 was 774 kilograms, its length was 3140 millimeters, its width was 1400 millimeters and its wheelbase was 2000 millimeters.

The vehicle was distinguished by such innovations as a front-wheel suspension of the MacPherson type, independent longitudinal torsion-bar suspension for the rear wheels, and an original steering design. For the front wheel drive they used half-axles with external hinges of equal angular speed (double Hooke's joints) and internal double-tongue hinges. This experimental vehicle went through a full cycle of laboratory and road tests and was a good basis for subsequent operations in the area of front wheel drive.

A number of foreign front wheel drive models were later tested in order to evaluate the merits and faults in their design, their lifespan and their suitability for our operating conditions. Not one of them turned out to be completely suitable for operation in conditions where there are large temperature differences, difficult road sections and many sectors with dirt roads.

The second front wheel drive prototype, the VAZ-2E-1101, was improved in comparison with its predecessors in terms of design and external appearance and was produced by the plant in 1973 (this one and the other were shown in a photo in the April issue of this magazine). Besides this specimen, a number of assemblies and a body were made for bench testing.

In 1974-75, the assemblies and units of the VAZ-2E-1101 served as the basis for two samples of the VAZ-11011, the so-called autorollers--vehicles with simplified utilitarian bodies, the panels of which were made by the bending method. The preparation of these experimental models concluded the first stage of operations in the area of front wheel drive.

The choice of a type of joints of equal angular speed pertains to the most important results of studies in this period. This theme was common to front wheel and four wheel drive vehicles (in 1973-76 work on the model VAZ-2121 was in full swing), and in 1975 a license agreement was concluded with the English firm (Hardy-Spicer.) On its basis, in 1976 VAZ started production of (Rtseppa-Birfield) joints for the VAZ-2121, and later these rights were extended to joints for the VAZ-2108.

Separate mention is necessary for the so-called vehicle-carriers, VAZ-1110. They existed in two prototypes and were a VAZ-2101 with the power-generating set of a front wheel drive Fiat-128. The carriers had original and different running gear. The basic task that was set in their design comprised the development of suspensions, steering and brakes for a front wheel drive vehicle that were suitable for our road conditions, under which the running gear, as tests of foreign vehicles showed, was the most vulnerable spot.

The last of the prototypes of its type in the preparatory period was the VAZ-4E-1101, which appeared in 1977. It embodied all the experience of preceding prospective and experimental work. The results of tests of ten foreign front wheel drive models were considered in its design. It is noteworthy that many of the designs incorporated in the VAZ-4E-1101 were subsequently developed further in the quantity model VAZ-2108.

It should be noted that by this time many leading motor vehicle firms in the world (Pugeot, Renault, Volkswagen, Ford and the Japanese plants), following Fiat, had begun the switch from classical and rear-motor designs to a scheme with front wheel drive and a transversely placed power-generating set.

On the basis of accumulated experience, fundamental designs for the prospective vehicle, like the conception as a whole, were developed in a short time. Design of the VAZ-2108 was begun in May 1977, the first prototype was ready at the end of 1978 and its laboratory testing was begun in February 1979. The exterior of the vehicle (see drawing) [drawing not reproduced] corresponded fairly

exactly to general tendencies of development in the form of economy passenger cars, so in the course of developing its design it was virtually unnecessary to make corrections.

Testing of the first series of prototypes showed very good operational properties, including safety, in the new vehicle. With the aim of advanced testing of the engine and running gear, lots of Sh- and D-type carriers were manufactured at the end of 1979, beginning of 1980. The first ones were a VAZ-21011 body with the power-generating set and front and rear suspension of a VAZ-2108 mounted in it. The second ones had a classical lay-out and were equipped only with the new 2108 engine. The D-type carriers were the predecessors of the VAZ-21068 modification (a VAZ-2106 with a VAZ-2108 engine), which went into operational use somewhat later. Then in 1980 the second series of prototypes was developed. Their laboratory and road testing was conducted at the plant and in the vicinity of Togliatti, as well as at the NAMI [Central Motor Vehicle and Engine Scientific Research Institute] testing grounds in Dmitrov.

In that same year, Minavtoprom, having in mind the export potential of the new model, enlisted a number of western European firms in the operational testing of the VAZ-2108 and in accomodating it to the contradictory demands of the foreign market.

The next series of prototypes (conditionally designated the 100 series), in which the observations and suggestions of foreign partners were considered, dates to 1981. No matter what external changes the vehicle underwent, the design of many assemblies and systems underwent improvement. In particular, the accent was on safety, durability and comfort in operation of the vehicle. The vehicles were assembled from certain licensed units and parts.

Specimens of this and subsequent series were tested according to an intensified program. As a rule, two or three passed intensive resource testing at the NAMI testing grounds--in a short time the total distance logged was brought up to 80,000,000 kilometers. They ran virtually all day at speeds close to maximum. In the testing process it was possible to bring to light and eliminate individual weaknesses in the design of the engine and production system. Production preparation went on parallel with operational testing operations, and part of the equipment for the manufacture of the VAZ-2108 had already been ordered on the basis of production forms and records for the 100 series.

Beginning with the next series, 200 (the end of 1981), vehicles underwent testing in various climatic and environmental zones, in particular northern ones, primarily in the rayon of Syktyvkar (Komi ASSR) and later in the rayon of Susuman (Magadan Oblast).

Mountain testing (in the Caucasus and in the rayon of Ordzhonikidze) included high speed driving on hairpin curves, towing a trailer and overcoming mountain passes. In Turkmenia, in the rayon of Chardzhou, the engine thermoregulating and interior ventilation systems were checked, as were the operational qualities of the vehicle in general in elevated temperatures. This was a harsh test of all its assemblies and systems.

According to the results of tests, individual assemblies were refined and improved, including the products of foreign suppliers, that were not fully satisfying our conditions for operation.

The last series of prototypes (300) was manufactured at the end of 1982 and the beginning of 1983. These were truly the kind of vehicles that should be coming off the conveyor in a year. Taking into consideration that the preparation for production was carried out parallel with the operational testing of the vehicle and that by 1983 the concluding phase had begun, many parts were installed on the 300 series that had been manufactured according to definitively developed technology.

A large role in operational testing of the vehicle and development of its design was played by sections of small series that were organized in each of the plant's production departments. Beginning in 1982, they subsequently intensified the production of assemblies and parts for the new vehicle and in 1983 provided the manufacture of 50-plus prototypes for widespread operational tests.

We note especially the contribution of the NAMI testing grounds, where alongside resource testing, they conducted tests on safety (front impact method) as well as on the corrosion resistance of the body and a whole number of others.

The production of vehicles for sale, as readers know, was begun at the end of 1984, and in the first half of 1985, vehicles began to appear in the stores.

12461
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GENERAL DIRECTOR ON GAZ MODERNIZATION EFFORTS

Moscow SEL'SKAYA ZHIZN' in Russian 12 May 85 p 2

[Article by N. Pugin, general director of the Gor'kiy Motor Vehicle Works Association, under the rubric "From Development to Introduction": "A Trailer Truck for the Countryside"]

> [Text] Gorkiy--Recently, a meeting of the CPSU Central Committee Politburo discussed measures for retooling the GAZ [Gor'kiy Motor Vehicle Works] Production Association, which provide for renovation of the Gor'kiy Motor Vehicle Works' production base on the basis of introduction of modern highly productive equipment.
>
> Today, we are publishing an article by N. Pugin, general director of the Gor'kiy Motor Vehicle Works Production Association, in which he describes the work being carried out by the collective of the enterprise.

The acceleration of scientific and technical progress and the necessity of reaching the best world indexes in labor productivity and quality of motor vehicles is an urgent task. Therefore, great attention is being devoted to the development and output of new models of motor vehicles with a diesel engine. which assures considerable economizing of fuel.

The multithousand collective of our association is also engaged in solving this complex task. The question is one of changing to the output of new GAS-6008 trailer trucks with a carrying capacity of 9 t.

Participating in its development, in addition to our designers, are the collectives of the Saransk Dump Truck Works, the Balashov Trailer Design Bureau, the Yaroslavl' Fuel Equipment Works and some sectorial and union scientific research institutes. The GAZ-6008 consists of a trailer and a motor vehicle with a six-cylinder air-cooled engine. The new diesel engine is more economical. It is also valuable because it ejects less toxic gases into the atmosphere.

Many progressive solutions were included in the design of the trailer truck. Thus, forced interlocking of the differential was installed on the motor vehicle.

The truck driver's cab was noticeably improved. A steering wheel hydraulic booster and a more improved heating and ventilation system were used here. The motor vehicle and the trailer are equipped with car bodies that can tip over to three sides, which reduces the expenditure of labor during unloading. Compared with GAZ-SAZ-53B, the metal volume of the truck trailer is 25 percent less calculated per ton of transported cargo. The trailer truck has superior roadability and is adapted for work in various weather zones--from the transpolar area to sultry Central Asia. Its first experimental models have undergone thorough tests and have shown good results.

Mastering the output of new diesel trailer trucks is to be done without a substantial increase in the number of workers. Therefore, a firm course has been set toward using the most advanced, modern manufacturing methods and comprehensive mechanization and automation of production. Introduced for this purpose will be automatic manipulators and industrial robots, machines with numerical programmed control, processing centers and microprocessing systems of control over industrial equipment and production.

Fundamental transformation will, of course, involve modernization of the leading enterprise--the motor vehicle works and its affiliates in Gorkiy Oblast as well as beyond. The difficulty is that they will have to be reorganized without reducing production output. For this purpose it will be necessary to commission blocks of diesel power-generating sets, axles, cardan shafts, nonferrous castings and die forging.

The state has allocated considerable funds for modernization of enterprises. But if a new plant was to be built, then five times as much funds would have been required. We plan to fulfill approximately 40 percent of all work by using our own resources. We are strengthening the material-technical base of our trust, the Gazremstroymontazh [not further identified]. Last year, it was ahead of its work by about R1 million. The scale of modernization also puts forward new requirements on the basic contractor--the Avtozavodstroy Trust [not further identified]. In order to promptly commission new capacities for the output of diesel trailer trucks, it should increase its work volume to R32-33 million annually.

Quite a lot is being done now in retooling operating production. For example, six automatic molding lines, several highly productive continuous action shot blasting barrels and other equipment were introduced in foundries, which made it possible to release more than 700 people from hard manual labor. In the process the quality of moldings was raised, which for its part had a positive effect on operations of machine assembly shops. Designing of line units was conducted simultaneously with their manufacture and assembly.

Great attention is being devoted to certification of work places. During the past 3 years, more than 2,000 units of obsolete equipment were written off and nearly 2,000 work places were released on the basis of certification. Such work will also be conducted in the future.

However, there are problems whose solution does not depend on us alone. Today, there is quite a lot of equipment in shops which has been in use for dozens of years. Labor conditions at some work places and sectors do not correspond to production requirements and are not very attractive to people. This applies particularly to assembly and press shops, where labor has so far been poorly mechanized and is marked by noticeable intensiveness and monotony. Measures have been worked out in this connection, which provide for improving production and granting some privileges to people working in such places. Proposals with regard to their realization have been submitted to the Council of Ministers and the Gosplan of the USSR. We hope that they will be closely examined.

There is still more. We believe that it is time to shift from many dozens of designs of automatic manipulators and industrial robots to series production of their modular design. It is also necessary to carry out unification of control systems of machines with numerical programmed control and processing centers.

The broad modernization that is being carried out today at the Gor'kiy Motor Vehicle Works, which is connected with a shift to the output of diesel trailer trucks for the countryside, has become a vital matter of the entire collective.

Recently, a regular meeting of the CPSU Central Committee Politburo discussed measures for retooling the Gor'kiy Motor Vehicle Works Production Association. Implementation of the outlined measures will make it possible to increase the output of trucks and substantially raise labor productivity and the quality of production being turned out.

9817
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MOTOR VEHICLES AND HIGHWAYS

ZIL TRUCK USE HAMPERED BY FRONT REAR AXLE SHORTAGE

Moscow IZVESTIYA in Russian 2 Jul 85 p 2

[Article by L. Osheverova: "We're Looking for a Front Rear Axle"]

> [Text] "Please help get a front rear axle delivered for a sovkhoz model ZIL-133G1 truck which has been inoperable since 12 December of last year. They in the regional agricultural equipment office are making helpless gestures: they would be glad to help, but the single solitary front rear axle sent to them was sent three years ago. The next one promised to be allocated will be in 1986."
>
> --F. Zinatulin,
> driver, Nerlskiy Sovkhoz,
> Kalyazinskiy Rayon,
> Kalinin Oblast

Even though a newspaper is not a supply organization and is not involved in spare parts procurement, we have decided all the same to look into the situation at the Nerlskiy Sovkhoz, where this truck is the sole heavy duty vehicle, and where right now, at harvest time, it is very much needed.

S. Lomtev, chairman of the Oblast Agricultural Equipment Office, with whom we got in touch by telephone, sighed heavily: "There's nothing I can do. They only send us six front rear axles for ZIL-133G1's in all each year for the entire oblast, but our requests....At present we have some 40 applications, made for 6-7 years in advance."

It turns out that the Nerlskiy Sovkhoz is not the only agricultural facility in the Kalinin Oblast which has ended up in a fairly complicated situation: a vehicle stands idle because of a lack of a needed part, and no one knows when the part will be available, and F. Zinatulin, the driver of the broken truck, for example, spends all these months working in the garage, and only rarely does he get to "turn the steering wheel", when taking the place of a comrade who has fallen ill.

But the Kalinin Oblast is not the exception. The scarcity of front rear axles for ZIL-133G1 trucks, as it has turned out, is a problem for almost all of the Selkhoztekhnika oblast and rayon administrations.

This front rear axle, as well as a number of the vehicle's other parts, is manufactured by the Ryazan Motor Vehicle Assemblies Works. A portion of its output is conveyed to Moscow, and a portion is sold out as spare parts. Last year, for example, the plant overfulfilled its plan: Selkhoztekhnika administratons received 1,440 front rear axles for ZIL-133G1 trucks instead of the scheduled thousand, but this number turned out to be too few, since at the time there had been 2,100 orders for these parts submitted. It was the same this year, but Soyuzglavavtoselmash [All-Union Main Agricultural Motor Vehicle Machine Building Administration], which is attached to USSR Gossnab, failed to increase the plant's plan quota.

Why? Because, as they explain it, the plan exceeds the norm by almost 3-fold. According to the norm, the Ryazan Motor Vehicle Assemblies Works has to manufacture a total of 316 front rear axles for the ZIL-133G1. Obviously, this is a mere drop in the ocean, even in spite of the fact that this truck was taken out of production some years back. Of course, the norm for front rear axle outlays for this vehicle is already obsolete.

I heard these same words from E. Levitskiy, who is the deputy chief designer of the Moscow Motor Vehicle Works imeni Likhachev, from A. Myasnikov, chief of the works' design department, and from V. Maltsev, chief of Soyuzglavavtoselmash's technical department as well. Their attitude to this problem is surprising. In fact, it is precisely Soyuzglavavtoselmash, working with ZIL designers and co-workers from the All-Union Scientific Research Institute for Motor Vehicle Transport have to develop and present new norms to replace the old ones to USSR Gosplan for approval.

Meanwhile the number of vehicles which are not operating, and this only by virtue of the fact that it is impossible to obtain front rear axles for them (by the way, the specialists confirm that this is the weakest spot in this vehicle), has been reduced only a little. But on the other hand, the number of orders for these parts is growing: the leaders of the agricultural facilities have been taught by their bitter experience and are trying to provide themselves with them for the future--even though the vehicle has been taken out of production, it has not been removed from those in use by the khokhozes and sovkhozes. So the scarcity is engendering a "thrift", which for the agricultural facilities themselves is turning into a still longer-lived wait for the needed part. And this is producing for them, as well as for the country, tremendous losses.

12659
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MOTOR VEHICLES AND HIGHWAYS

TESTING, FEATURES OF ZIL-4331 DIESEL TRUCK

Moscow SOVETSKAYA ROSSIYA in Russian 13 Aug 85 p 4

[Article by S. Tsoy, SOVETSKAYA ROSSIYA correspondent: "ZIL-diesel on the Road"]

[Text] Moscow--Visitors to the "Avtoprom-84" exhibition at USSR VDNKh [Exhibition of National Economic Achievements] in the autumn of last year probably paid attention to the unusual ZIL-4331 truck train with trailer, whose hood carried the legend "diesel" in shiny nickel. What kind of vehicle is it, anyway? Our correspondent visited the NAMI [Central Motor Vehicle and Engine Scientific Research Institute] testing grounds, where it is undergoing trials right now.

It looks like a large airport--the biggest motor vehicle testing grounds in Europe. Motors are audible day and night on its roads, which are complete with artificially created defects.

It is comfortable in the cab of the ZIL-4331. Instruments are conveniently arranged on the wide, attractively trimmed panel. The windshield is 1.5 times wider and higher than that of the ZIL-130. In a word, it is as though the whole road were laid out on the palm of your hand.

Our vehicle starts easily from third (!) gear. The capacity of its engine is 185 horse power, which is 35 more than that of the present non-diesel series. On the "Belgian road"--a roadbed paved with uneven cobblestones--we travel at a speed of 60 kilometers per hour. One can only guess that the undercarriage is experiencing severe stress. The cab rises and falls smoothly, without tossing you up in the air or from side to side as ordinary trucks do. Only a Zhiguli!

"I have been driving for 20 years," confides driver V. Khripenchuk, "but I don't remember such a 'soft' vehicle. There is no rocking here at all. And the clever thing is that a sensibly designed shock-absorber has been installed under the driver's seat. There are eight speeds in the transmission. This kind of vehicle handles steep inclines easily."

We are arranging a tough test for the vehicle on a specially equipped track. Metallic mounds are installed in such a way that the left front wheel and the right rear wheel, and vice versa, encounter them simultaneously. It bends the

frame in various directions. The six-ton load on the platform of the truck train exerts pressure on the frame. However, the engine operates smoothly, without straining.

These driver-testers have a difficult job. Loads are such that they sometimes barely limp back to their hotels after a night shift. Only one example: in a shift drivers must go only 16 kilometers. But what difficult ones!

"On the 'washboard'," Khripenchuk tells me, "we go through resonance oscillations. It wears you out! But it's interesting work!"

The operational development of the vehicle is in full swing. But it is already obvious that the vehicle is well designed.

"The process of designing a basically new vehicle," says V. Pevtsov, assistant chief designer, "is like a tree with many branches, from which your ideas and wishes are constantly falling to the ground. Let's say you want to build a superlight vehicle. By skimping on metal, you lose in the area of longevity; if you install a large radiator for operation in southern regions, it's just an added burden in the north..."

The ZIL-4331 is not inferior to the best of the foreign models. It will be a reaper and a builder, hard working and durable in climatic conditions from the Arctic to Africa. ZIL workers will put out the first 50 vehicles on the eve of the 27th party congress.

12461
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MOTOR VEHICLES AND HIGHWAYS

FEATURES OF NEW DNEPR MOTORCYCLE MODELS

Moscow ZA RULEM in Russian No 8, Aug 85 p 4

[Article by V. Svyatnenko, engineer: "New Item in the Dnepr Line"]

[Text] Kiev--The Kiev Motorcycle Works has started quantity production of new vehicles, the Dnepr-11 and the Dnepr-16. The first has replaced the Dnepr road bike model MT10-36, and the second replaces the Dnepr-12 with increased cross-country capability. The latest demands in active and passive safety standards have been taken into consideration in these developments, as have the wishes of motorcyclists.

First about the new units that are common to both models. These are the wheel brake on the side-car, the parking brake, lights and combined switches.

The improvements concern design factors that increase traffic safety. The braking distance, from 60 kilometers per hour, has been shortened by 5 meters. The power-driven parking brake operates reliably on the rear wheel and the wheel of the side-car, holding the motorcycle on an incline. Braking force is transferred from the general pedal to an unequal lever-equalizer, which distributes it between the brakes of the rear wheel and the side-car wheel in a 7 to 3 ratio. The equalizer also serves to ensure that the brakes of both wheels engage simultaneously. If there is play or wear in the drive of one of the mechanisms it does not affect the efficiency of their operation, since all errors will be compensated for by the turn of the equalizer.

The drive of the side-car wheel brake is a cable linkage. There is a stop with an adjusting bolt welded to the pedal. If the brake cable stretches too far of breaks, then the equalizer catches on the bolt with the lower shoulder. Then the driver will be able to operate only the rear brake.

The parking brake is installed on the middle section of the frame on the right tube. In order to engage it, one presses with the foot on a pedal as far as it will go, then releases the brake handle with the hand and turns it 90° outward. Then a bolt that is located on the lower part of the handle touches a special stop on the pedal and fixes it in braking position.

The motorcycle is equipped with new light-signaling devices and combined rear light and turn signal. They differ from the ones being replaced by virtue of better lighting engineering parameters.

In order to improve the driver's seat, the handle bars have been given a new form; combined switches, which have also undergone changes, are mounted on them. The turn-indicator switch is located on the left. It is part of a unified design with the signal button and the low-high beam switch.

The switch for the illumination mode (it is on the right side) has three positions: the furthest right (D--daytime) is for daylight driving, the middle one (in between) is for night driving in the city, and the furthest left (N--nighttime) for night driving outside the city. The emergency ignition switch is in this same unit.

On the arm of the front brake lever is the stop signal. Now the signal lights up not only when the foot pedal is pressed, but also when it is set with the brake lever.

The Dnepr-16 model has a drive on the side-car wheel that ensures a higher level of cross-country capability on difficult sections of roadless conditions.

The motorcycle is equipped with a 650-cubic centimeter overhead engine that is unified with the Dnepr-11 motor. An asymmetrical spur differential is mounted on one assembly with the final drive. It distributes torque between the rear wheel of the motorcycle and the wheel of the side-car in a ratio of 19 to 11. From the differential through a transverse drive shaft, torque is transferred to the side-car reduction gear, which is mounted on the lever of its wheel suspension. This shaft is designed so that, thanks to its elasticity while turning, it alleviates impact loads that arise in the side-car wheel drive during operation.

The Dnepr-16, as opposed to the Dnepr-11, has two separate seats.

The plant continues to work on improving the vehicles it produces. This year the projection calls for organizing production of a new air filter with a disposable paper element, which will improve air purification significantly. New K-63 carburetors will be adopted, which are more stable in adjustments. A vehicle equipped with them becomes more economical.

In the future the plan is to make changes in the valve gear with the aim of reducing heat stress on the engine, which means that its lifespan will be increased. Production preparation for a new side trailer is ongoing.

The innovations affect not only the design of the motorcycles, but also the manufacturing processes used for their parts and assemblies. In total, the measures being undertaken should significantly raise the technical level and the quality of the Dnepr motorcycles.

Technical Characteristics of the Dnepr-11 Motorcycle (with data for the Dnepr-16 in parentheses)

General data: Dry mass--330 (335) kilograms; payload--260 kilograms; maximum speed--105 (95) kilometers per hour; braking distance from a speed of 60 kilometers per hour--not more than 30 meters; controlled fuel consumption--8 (8.5) liters per 100 kilometers; fuel supply--19 liters; tires--95-484 or 3.75-19. Dimensions: Length--2500 (2430) millimeters; width 1800 (1700) millimeters;

height--1100 millimeters; base--1510 millimeters; ground clearance--125 millimeters; wheel track--1140 (1200) millimeters. Engine: Type--four-stroke with air cooling; number of cylinders--2; working volume--649 cubic centimeters; compression ratio--7.5 (7.0); valve mechanism--OHV; capacity--36 (32) horsepower per 27 (24) kilowatts at 5900 (5500) revolutions per minute; carburetor--K301D. Transmission: clutch--dry, dual disk; gear box--four speed, with reverse; gear ratios: I--3.6, II--2.28, III--1.7, IV--1.3, reverse--3.67; transmission to rear wheel--drive shaft; gear ratio of the final drive--4.62 (transmission to the side-car wheel is by drive shaft; gear ratio for the side-car wheel reduction gear--2.4). Running gear: Frame--tubular, welded, duplex; front fork--telescoping, with hydraulic shock absorbers; rear suspension--pendulum, with hydraulic shock absorbers; brakes--drum.

12461
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MOTOR VEHICLES AND HIGHWAYS

KiAZ MOTOR VEHICLE WORKS PLANNED FOR KIROVABAD

Baku VYSHKA in Russian 28 Aug 85 p 2

[Interview with Al'fred Il'yich Vaysman, chief engineer for plant design, by A. Gamedov, VYSHKA special correspondent: "KiAZ--A Family of New Soviet Motor Vehicles"]

[Text] By resolution of the party and government, a motor vehicle plant will be built in the 12th Five-Year Plan in the city of Kirovabad, Azerbaijan SSR for the production of small trucks, such as have not yet been produced domestically.

In planning the construction of the plant, the central directive organs studied many factors, among them ones like the development of union republics according to plan and the growth of small and medium cities.

The rayon for the construction was chosen with consideration of the recommendations of USSR Gosplan's Gosekspertiz. Construction sites in the environs of Baku and Kirovabad were analyzed. The specialists chose a place in the southeastern part of Kirovabad. This site could be supplied with the basic types of energy resources without great expense.

Indeed, if we look at a map of Azerbaijan we note that the city is located in the middle of large sources of electrical energy--the Mingechaur GES [hydroelectric power plant] and the Azerbaijan GRES [state regional electric power plant] are to the northeast of it and the Shamkhor GES is to the southeast. A pipeline is being constructed from the reservoir of the last GES to Kirovabad. The western part of the republic is supplied with gas, it is crossed by railroad lines and highways in various directions and air transportation is well developed. The working class of this region is known for its traditions and mastery and for their successful solution of technical and economic tasks. Vuzes, technical schools and professional-technical training schools are concentrated in Kirovabad, and in the city and adjacent rayons there are available labor resources. In general it is possible to cite many well founded arguments that prove the advantage of the chosen construction site for the plant.

The general designer of the new enterprise is the State "Badge of Honor" Institute for the Design of Motor Vehicle Industry Plants--Giproavtoprom. This is one of the oldest design institutes in the country. Its specialists have completed designs and participated in the construction and start-up of the largest motor vehicle engineering plants in the country. Among them are VAZ [Volga Motor Vehicle Works], KamAZ [Kama Motor Vehicle Works], the Minsk Motor Vehicle Works, and the Kremenchug, Kutaisi, Ulyanovsk, Uralskiy and other motor vehicle plants. The institute has completed plans for foreign motor vehicle plants.

The customer is the AvtoUAZ [Ul'yanovsk Motor Vehicle Works] production association, which includes the new enterprise and the management of the plant built in Kirovabad.

There are four general contractors: the republic's Minpromstroy, USSR Mintransstroy's Azerbaykzhantransstroy trust, Minstroy-avtodor and the No 23 mechanized column from USSR Minenergo's Kavkazelektroset'stroy trust.

The chief engineer of the project design is A. Vaysman. He accounted for design operations for the establishment and construction of the Moscow Motor Vehicle Works imeni Lenin Komsomol, the Saransk Tsentrolit plant and others.

Our VYSHKA correspondent addressed him with the request to talk about the new enterprise.

[Question] First we would like to find out, Al'fred Il'yich, what economic and social problems dictated the construction of the new plant? It seems that this branch of industry is already producing all types of vehicles, from 180-ton ones to the very smallest; not long ago, for example, production of the economy Oka was announced.

[Answer] In order to answer this question more completely, let us refer to the materials of the April (1985) Plenum of the CPSU Central Committee and the deliberations in the party central committee on problems of accelerating scientific and technical progress; in these deliberations a general line was projected for the further, faster development of the entire national economy. Most important are the intensification and increased efficiency of production based on more skilfull use of the most advanced achievements of scientific-technical progress.

If we examine intra-city shipments in the area of trade, public services and supply from this point of view, that is if we approach it with a measure of the greatest efficiency, then a number of deficiencies are made manifest. For example, school notebooks, pencils, pens, ink and textbooks are distributed to stores on trucks with a capacity of 2.5-5 tons. This is like shooting at sparrows with a cannon.

Vehicles of that same capacity are enlisted for the delivery of goods, bread products, linens and chemicals to welfare service institutions, etc. An analysis of motor transport operations in city conditions indicates that with the growth of the truck fleet owing to KamAZ, ZIL [Moscow Motor Vehicle Works imeni Likhachev] and GAZ [Gorkiy Motor Vehicle Works] vehicles, expenditures for the transport of one ton of freight are increasing, which is a sign that in many cases the capacity of vehicles is not being fully utilized. A reduction in cost may be achieved by increasing the number of small-capacity vehicles, primarily in the range of 1-2 tons.

This phenomenon was analyzed in the CPSU Central Committee and in the government; it was reflected in the resolution of the CPSU Central Committee and the USSR Council of Ministers, "Increasing the efficiency of use of trucks in the national economy, strengthening the struggle against additions in freight shipments by motor transport and guaranteeing the preservation of fuel-lubrication materials", which was adopted in December 1983. In it, in particular, it is said that the structure of the truck fleet in many ways fails to meet the conditions of shipments and the national economy is experiencing a shortage of small-capacity trucks and specialized vehicles. It mentions the necessity of developing vehicle production with the aim of forming a rational structure for the country's truck fleet.

The Kirovabad plant will also facilitate the solution of the given problem. It is designed for the production of vans with a capacity of 1.5 tons and an economical diesel engine--10.5 liters of fuel to 100 kilometers. (For comparison: the Volga GAZ-24 takes 15 liters of gasoline.)

Calculations show that in using these vehicles, expenditures on intra-city transports will be much reduced. A significant number of large trucks will be freed from impractical transports. In this way, the 1.5-ton trucks will become a noteworthy force, capable of making a contribution to increasing the efficiency of the national economy.

There is another side of the problem here as well. Right now the full-drive van from the Ulyanovsk plant is being partially used on intra-city transports. In correspondence with the Food Program, which also stipulates the strengthening of the material-technical base of agriculture, a greater number of various motor vehicles must be sent there. After the plant in Kirovabad goes on line and our cities begin receiving its products, the supply of agriculture with vehicles for the transport of small loads of freight will proceed more intensively, and the demands of the agriculturalists will be fully satisfied.

As is known, the Ulyanov jeep is capable of overcoming even roadless conditions. Using them on asphalt highways is wasteful to a lesser degree. This, as they say, does not conform to the demands to increase the efficiency of social production. With the start-up of the new plant this problem will also be removed little by little from the agenda.

[Question] One encounters the name of the future vehicle, KiAZ, in documents. It probably arose from the tradition existing in Soviet vehicle engineering: the vehicle is named after the enterprise, whose own name derives from that of the city. Please, tell us about the vehicle itself.

[Answer] Yes, such a tradition exists, and KiAZ stands for Kirovabad Motor Vehicle Works. It will produce trucks--vans. Their purpose will be the transport of all types of food products, as well as consumer goods and supply and welfare services freight in cities and suburbs over the entire territory of the USSR.

The basic model of the new vehicle is a truck with an all-metal body-van that has 11 cubic meters of freight space and 2 large doors--on the side and in back.

The side door slides and does not require space for opening. The dimensions of the van and doors are made to coordinate with those of domestic containers for the shipment of goods as well as with the containers of SEV [Council of Economic Interdependence] member-countries.

An extraordinary feature of the van is the small loading height--65 centimeters, which is less than that of analogous foreign designs. Therefore loading and unloading operations are made much easier. Besides which, the large height of the body--1.85 meters--allows a man to go freely inside and stow a load more rationally and load the vehicle completely.

In the future, designers will establish a whole family of various modifications on the basis of this 1.5-ton vehicle. Among them will be long-bed vehicles with the van enlarged by 600 millimeters as well as a unified chassis assembled with a special body. A design with a vehicle-borne variant is stipulated.

The list of modifications could be continued: vehicles based on this one may have special bodies--refrigerated, isothermic, specialized for the transport of bakery products or furniture, to play the role of a freight taxi, etc.

The vans can be equipped as repair shops for welfare and communal services and as buses for 14-18 people.

In developing the design of the new vehicle, they are carrying out a broad-based unification of units and assemblies with potential models of a close type--UAZ [Ulyanov Motor Vehicle Works], YerAZ [Yerevan Motor Vehicle Works] and others. This concerns the engine primarily. The utilization on vehicles of a different brand of unified units and parts opens broad possibilities to specialize their production at individual enterprises with automated production and makes it easier to liquidate the so far still substantial spare-parts shortage.

Advanced materials and designs are widely used in the plans for the KiAZ. For the manufacture of the body and cab, it is supposed that special steel sheeting in rolls will be used; the production of it is being mastered in the USSR. Its feature is that when the van is drying after being painted, self-hardening of the metal takes place owing to its recrystallization.

It is projected that plastics will be widely used on the KiAZ. They will go into the manufacture of bumpers, hoods, wheel arches, and a number of other units, and into the finishing of the van and cab. By the way, high quality finishing is stipulated for the cab interior, comparable to passenger cars. Thanks to the use of plastics, 100 kilograms of metal will be saved on each truck.

This vehicle has one feature that is new for domestic motor transport--in its design the task was set that a non-professional driver should be able to operate it, that is someone with an amateur driver's license. For example, tradesmen with ordinary driver's licenses can get behind the wheel and make housecalls to clients. For such a combination of skills a specialist would receive additional pay. Such a possibility is of no small import in the recruitment of workers to the area of welfare and service.

Another feature of the KiAZ is its comfort, the ease, without physical strain, of steering and maneuverability. These qualities in the vehicle allow even women to drive it.

[Question] Your story has painted the picture of a remarkable vehicle--practical and simple to drive. Now, perhaps, it is impossible even to imagine in what other areas of public life it might prove highly useful to people. Tell me, has work been going on long on its design? And a second question too--what is the factory like that has been designed for the production of these vehicles, and to what degree will it meet modern needs for scientific and technical progress?

[Answer] The Central Scientific-Research Vehicle and Motor Institute collective has been working on the design of the vehicle for more than two years. In recent years designers from the Ulyanovsk production association AvtoUAZ, whose membership includes the Kirovabad plant, have also been involved in the project. The vehicle has already gone through the model and engineering development stages. Right now the first prototypes are undergoing testing in Dmitrov and Ulyanovsk.

The Kirovabad plant is being designed in the usual way for motor vehicle plants. It will have such production processes as forming and assembly of the body and units, painting of the body and units and internal finishing and general assembly of the vehicle. Mechanical units--the chassis, front suspension, rear axle and others--will be manufactured in the mechanical assembly industry.

The production of the plastic parts that I talked about earlier is also projected for the plant. Besides that, there will be tool and repair shops, warehouses and other facilities for auxiliary production.

In the design particular attention has been paid to ecology and preserving the environment. The systems for recycling and secondary use of water that are used allow water consumption to be reduced 8-10-fold. All industrial discharge will be subjected to purification in the plant's purification facilities and the purified water will be returned to the technical water supply system for production. After purification, rainwater is received into this same system.

There will also be secondary use of energy resources, including the heat thrown off by the ventilation system. All this will allow heat and fuel consumption, respectively, to be reduced by 15-20 percent. There are plans for purifying the polluted air before releasing it into the atmosphere.

The plant's shops will be equipped with modern progressive equipment with the widespread application of flexible automated lines, robots, machines with numerical programmed control, automated conveyor systems and mechanized and automated warehouses. This entire complex system will be controlled by computer.

From what I have said it is apparent that KiAZ will become an enterprise with a high level of automation and mechanization in basic and auxiliary production, where heavy manual labor has been eliminated. Thanks to a high level of technical equipment, tens of thousands of 1.5-ton vehicles will be produced each year.

[Question] Taking into consideration the whole Union, isn't that a small number?

[Answer] Then I will ask, do you see a lot of RAF [Riga Bus Works] minibuses operating on the streets of Baku? A lot? Well, KiAZ's will be produced at twice the rate. One does not need a good imagination to foresee that with time they will become noticeable on the streets of our cities and they will be reliable operational truck transport for thousands of organizations and institutions. KiAZ is a vehicle with a real future and great potential.

[Question] You have convinced me. And what about export? Will it be competetive on the world market?

[Answer] There is no doubt of this. The designs built into the plans for the vehicle and the plant make it possible to say that KiAZ will be a first-class vehicle, surpassing foreign products in certain areas, particularly those vehicles produced in France, FRG, Italy and other countries.

The solutions pertaining to the design of the vehicle, the technology of its production and the equipping of the enterprise were adopted taking into consideration that which has been said. What remains will depend on the quality of construction and the quality of labor on the part of the future vehicle builders. I will even say this--it will be primarily this that determines the competetiveness of the vehicle.

It is already known that the enterprise will be equipped with the newest equipment. It must be installed and put into operation in such a way that all its technological demands are strictly observed--the high quality and reliability of all units depends on this, and that means that the vehicle as a whole does also.

We need to concern ourselves now with the training of future workers and new engineers--professions that are so far absent in Azerbaijan. This has been determined by joint resolutions of the Azerbaijan Communist Party Central Committee, the Council of Ministers of the republic and Minavtoprom, which stipulate the widespread training of potential KiAZ worker-specialists at the industry's leading plants--UAZ, GAZ and others.

[Question] Not insignificant construction forces are concentrated in Kirovabad. But they have a weak industrial base. What will they do, will they manage on time? Do they guarantee the high-quality construction of the plant?

[Answer] In connection with the construction of the plant, USSR Sovmin has allocated 6.2 million rubles to strengthen the contractors' industrial base, by way of exception. These funds should be purposefully used so that the newly created capabilities facilitate the successful completion of the plant, the schedule of which is firm--it is to begin in 1986 and be complete in 1990.

In connection with the beginning of construction on the plant, I want to bring up an important problem with the laying of water pipline from the reservoir of the Shamkhor GES to Kirovabad. The thing is, that the plan for erecting the plant, the sequence of commissioning its capabilities and start-up adjustment operations assumes that pipelines and city purification facilities will go into operation no later than 1988. Otherwise the start-up of the plant in 1990 will be impossible. One would think, considering the seriousness of the problem, that the Kirovabad party gorkom, gorispolkom and the republic Minzhilkommunkhoz would take the laying of water lines under their strict control.

Along with the enterprise, housing for the families of plant workers, a school, preschools, a hospital with a polyclinic, dispensaries, a pioneer camp and other social welfare facilities will be built. A professional-technical training school will be built at the plant for the systematic training of cadres.

[Question] What other organizations have been enlisted in developing plans for the motor vehicle plant? At what stage is the plan? When will the contractors receive the necessary documentation?

[Answer] It has been resolved that the collectives of local organizations--the institutes Azgospromproyekt and Azgosproyekt and the Baku section of Soyuzvodokanalproyekt--will compile the design-technical documentation for the fulfillment of the basic volume of construction and sanitation-technical operations, the construction of water supply and waste-water disposal systems and the erection of housing and social welfare facilities. Specialized organizations will be enlisted to develop designs for electrical supply, fire-prevention automation and conveyor systems.

The construction of the plant is beginning in unusual circumstances--without a confirmed plan. This creates certain difficulties for the customer and the contractor. But there is no alternative. The compilation of a shop drawing needs to be accelerated, so that the builders can start working on a broad front from the very first days of the 12th Five-Year Plan.

To Decide, without Procrastinating

> The construction of a motor vehicle plant and, in the future, the setting up of vehicle production are large-scale projects affecting many sides of economic life. Problems move into the foreground that we must try and solve now, without putting it off until tomorrow. The following have been asked by the editors to express their opinions on these problems:

K. Abdullayev, director of the enterprise that is being built--We are going through a complex transition period. The management has been set up for the plant, and it will comprise about 30 people. We do not yet have all the technical documentation for the volumes of construction-assembly work stipulated by the plan. Only the Baku section of the Soyuzvodokanalproyekt Institute has delivered blueprints, in the volume of 500,000 rubles, that stipulate the construction of off-site water supply and waste-water disposal networks. We have received telegrams from Giproavtoprom, Azgospromproyekt and Azgosproyekt,

stating that the blueprints have been sent out. I hope that we will receive them soon. Then we will begin to conclude agreements with the contractors for the completion in 1986 of not less than 15 million rubles worth of construction-assembly work.

According to the directions of management organs, by the end of this year we must organize 300,000 rubles in capital investments for preparatory operations on the industrial area of the plant. They have already been begun. A 6-8-kilometer temporary road is being laid from the base of the construction industry to the construction site under the command of a general contractor from Minpromstroy trust No 3. In August, not less than 45,000 rubles will be assimilated. In the future that rate will increase.

The Minpromstroy trust, Orgtekhstroy, prepared a plan for the erection of temporary structures on the construction site. Included therein are an administrative-welfare complex for contracting organizations, cafeterias, stores and the laying of water and electricity lines. Trust representatives are now involved in referencing the blueprint to the site.

We are also involved in training workers for the plant. In accordance with existing directions, together with the Goskomitet on labor, we have chosen more than 50 men from the Soviet Army Reserves and sent them to the Ulyanovsk Motor Vehicle Works. They will work there for 3-4 years. At the close of two years of work, we will bring them here for apartment registration. On their return to Kirovabad they will be given comfortable apartments. Housing and social-welfare facilities will be built parallel with the construction of the industrial buildings.

Before the end of the year we will send about 150 more men to UAZ, as is stipulated by the plan.

F. Faradzhev, deputy chairman of Azerbaijan SSR Gosplan--The Azerbaijan Communist Party Central Committee and the Council of Ministers of the republic consider the construction of the motor vehicle works one of the most important tasks for party, council, economic, trade union and komsomol organs. They have been ordered to develop party-mass and organizational work for the timely completion of planning and construction-assembly operations, the selection and training of cadres and the establishment of the necessary social-welfare conditions for the construction and operation periods of the new enterprise.

The republic's Gosplan inquired of USSR Minavtoprom about the specialists with higher and specialized education that will be required at the Kirovabad plant for the years 1986-1990. Now it is clear for us. On this basis the plan is to have the republic's Minvuz and Minpros train these specialists in the educational institutions of Azerbaijan; they will also be trained, by non-competetive admission, in the country's vuzes and special high schools.

According to Minavtoprom data, the plant will require highly trained cadres in eight professions. It turns out that we are unable to train them in the republic's vuzes in only two specialties. These are the specialties Motor Vehicles and Tractors and Machines and Equipment for Processing Metals with Pressure.

These will be trained at the polytechnic institutes of Kiev, Lvov, Gorkiy, Lipetsk, Volgograd and Belorussia. In the future, we will increase the number of students sent to these vuzes.

Our youth will be trained in other specialties needed for the plant at the Polytechnic Institute imeni Ch. Il'drym, engineering-construction, and at the Institute of Economy imeni D. Buniatzade. On finishing their studies, graduates will become specialists in machine engineering, metal-cutting machine tools, internal combustion engines, technology of robotized production, automated manipulators and industrial robotized complexes, computers, industrial electronics, industrial and civil engineering, economics and production organization, accounting, etc.

Specialists of various professions with specialized education that are needed by the plant, for example, in vehicle engineering, adjustment of machine tools with programmed control and tractor equipment, will be alloted to us according to the plan for interagency and inter-republic distribution.

All of the above says that the Kirovabad motor works will not experience shortages of qualified specialists of the necessary types.

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MOTOR VEHICLES AND HIGHWAYS

NEW MODEL TRUCK TRAINS FOR AGRICULTURAL USE

Moscow SOVETSKIY PATRIOT in Russian 9 Jun 85 p 4

[Article by S. Pedenko: "For Agriculture"]

> [Text] The imposition of stricter requirements regarding quality in gathering and shipping our harvests, and the need to improve the efficiency and the productivity of the rolling stock have called for the development of new trucks and trailer models for agricultural use from our truck builders.

Agricultural dump trucks are designed for use in hauling bulk loads of grain, vegetables and other bulk loads. The gear ratios in their transmissions are selected so as to allow the driver to easily adapt the speed of the vehicle to that of the speeds at which harvesting or other agricultural equipment operate. The dump trucks' designs have been provided with bidirectionally dumping bodies (the Saransk Dump Truck Works also has plans to manufacture a dump truck version with a tridirectional unloading feature).

Designers have made prior provision for the installation of extended sideboards on the bodies of agricultural dump trucks. This will increase their volume almost 2-fold. However, practice has shown that these boards do not always insure adequate sealing at their joints, and thus do not insure the safekeeping of the load in transit.

The KAZ-4540 [Kutaisi Motor Vehicle Works] truck tractor, coupled to a GKB-8535 trailer is the first Soviet unit of motor transport equipment developed with consideration made for the upgraded requirements. The truck trains which form a part of this motor transport equipment will be manufactured by the KAZ Production Association (the head enterprise of which is the Kutaisi Motor Vehicle Works imeni Ordzhonikidze).

The Saransk Dump Truck Works plans to produce another dump truck train for use in agriculture. Its rolling stock will consist of the GAZ-[Gorkiy Motor Vehicle Works] SAZ-4509 dump truck tractor and the GKB-8536 dump truck trailer.

Neither of these trucks is reminiscent in any way of the usual GAZ's or Kolkhidas. Only their configurations have remained traditional, i.e., the hood configuration for the GAZ-SAZ tractor and the hoodless configuration for the KAZ truck--the name of which "Kolkhida"--was kept as well.

The new dump truck tractor models are diesel-powered. The diesel engine used in the Saransk dump truck is an in-line six cylinder, and is air-cooled. The Kutaisi truck is being fitted with a YaMZ-642 model liquid-cooled diesel engine. This is a V-6 engine, and has been standardized with the KamAZ [Kama Motor Vehicle Works] diesel engine.

These engines are respectively rated at 125 horsepower (92 KV) at 2,800 rpm and 160 horsepower (117 KV) at 2,600 rpm.

The cab designs for these new dump trucks have been well thought out: their flat panels and the use of rivets simplify repairs on them in the field.

12659
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MOTOR VEHICLES AND HIGHWAYS

1ST DEPUTY MINISTER ON MOTOR VEHICLE 'DIESELIZATION' PROGRAM

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 2 Jul 85 p 2

[Article by Ye. Bashindzhagyan, first deputy minister, Ministry of the Automotive Industry under the rubric "Technical Progress: Resources for Its Acceleration": "Heading Out Onto the Main Highway"]

[Text] Motor vehicle transport freight turnover has increased 3.5-fold in the last 20 years. This year, this sector will be responsible for hauling 75-80 percent of all freight shipments. Buses presently transport half of the country's passengers. The steady growth trend in motor vehicle transport freight turnover is turning, however, into an increase in the demand for fuel and for maintenance personnel. The motor vehicle transport sector presently consumes over 70 million t of fuel and uses a work force of 10.5 million people.

In a situation such as this, the most critical task faced by the truck builders is that of developing vehicles which will help to increase freight turnover even further, while at the same time stabilizing the demand for fuel and maintenance personnel. At the recently held meeting of the CPSU Central Committee, with regard to the problems of speeding up scientific and technical progress, in this connection, the importance of converting truck transport to diesel fuel was emphasized, and the need to overcome the lag which has been noted in this area was pointed out as well. Domestic and world practice are showing that dieselization combined with a sharp increase in the manufacture of truck trains are precisely the factors which are presently determining the primary trend in the development of truck transport. The replacement of gasoline engines with diesel engines is effecting a 25-30 percent savings in fuel, with a 40-45 percent saving in the truck train stock, as well as increasing the labor productivity of each of the drivers. These principal virtues are complement the other important advantages, i.e., a high degree of reliability, a low level of fire hazard, reduced toxicity and a number of others.

However, on the other side of the scales we find that diesel engines are 1.5-fold more labor intensive than gasoline engines. The requirements for precision in their manufacture are much more stringent, as are those for the quality of the materials of which they are made and completed. This also means that production retooling is associated with massive capital outlays.

The long-term program to improve the domestic motor vehicle building industry provides for immediate growth in the manufacture of heavy-duty trucks and truck trains by the BelAZ [Belorussian Motor Vehicle Works], MAZ [Minsk Motor Vehicle Works] and KrAZ [Kremenchug Motor Vehicle Works] motor vehicle works, since this is precisely where dieselization has the greatest effect. The establishment of the one-of-a-kind Kama Motor Vehicle Works complex, which made it possible to convert not only KamAZ trucks to diesel fuel, but a number of ZIL truck models as well, constituted a major step in the realization of this program. Large-sized buses and other vehicles manufactured at the Urals Motor Vehicle Works have also been converted to diesel operation. As a result, the portion of their production made up by diesel trucks has increased considerably overall in recent years.

Plans for the 12th Five-Year Plan period call for a multidimensional expansion in the dieselization of truck transport. A new generation of V-block diesel engines is being readied for production at the Yaroslavl Motor Vehicle Works, and will power the modern, highly-productive heavy duty trucks now being produced at the Minsk and Kremenchug motor vehicle works. This line of engines will also power the Kirovets tractors, and the more powerful 12-cylinder models will make possible the modernization of the 27- and 40-ton BelAZ dump trucks. Plans for this same period call for continued growth in the production of heavy-duty diesel truck trains, this to be brought about by putting all the capacities of the Kama Motor Vehicle Works complex into operation.

The setting up and putting of first phase capacities into operation and the start-up of dieselization of the most mass-produced ZIL and GAZ trucks in the upcoming five-year plan period will constitute an important stage in dieselization. Every single ZIL-130 truck uses an average of 10-11 t of gasoline per year. The same truck, if using diesel fuel, would use no more than 8 t. Where such a truck is operating with a truck train, its fuel economy is almost doubled. The diesel-powered ZIL truck trains, which have a load capacity of 12-14 t, and the GAZ, with a 9-ton capacity increase the drivers' labor productivity 1.5-fold and 1.9-fold respectively.

The picture should be filled in by the prospect of putting Kutaisi Motor Vehicle Works capacities for production of their 6-cylinder engines, which have been standardized with KamAZ, into operation, and by the 1987-1988 start-up of production of air-cooled diesel engines at the Kustanai Motor Vehicle Works, which is now under construction. Next in line is the dieselization of light trucks and passenger cars designed for active operation. The Scientific Research Institute for Motor Vehicles and Motors has begun developmental work on a small-displacement high-speed gas-turbine-supercharged diesel engine for 1.5-ton trucks, as well as for all-wheel drive passenger cars and utility cars, microbuses and taxis. The setting up of production of low-tonnage trucks will complete the product array of production vehicles with the model most needed by the national economy.

Thus, by increasing the production of diesel-powered vehicles, the national economy's transport needs will be met by the end of the 12th Five-Year Plan period with no concomitant increase in the total number of those employed in the sector and no increase in fuel consumption, but naturally with zealous

and competent operation of the fleet. Future plans call for the continued increase in the dieselization level. However the rates at which this increase occurs have an objective limitation which is determined by the country's fuel balance.

In connection with this, awareness of the importance of continued improvements in carbureted (gasoline) engines is being kept at a high level, all the more since scientific and technical progress has made possible the use of a number of effective resolutions in this area. The use of turbulization to mix the fuel with the air, and its use to improve the combustion process in GAZ-53 truck engines in 1984, for example, reduced fuel consumption by 5-7 percent. This innovation is presently being used at ZIL. The result is that the vehicles manufactured this year by only two plants will save no less than 250,000 t of gasoline.

And alternate fuels make up another important trend. The sector is carrying out its directive instructions concerning the conversion of gasoline engines to gas operation. Today, in the wake of efforts conducted by NAMI [Central Motor Vehicle and Engine Scientific Research Institute], it has been made possible to determine the actual prospects for additional production in the years ahead of vehicles which operate on the new gas-diesel process, and which process provides up to a 70-75 percent saving of diesel fuel with accompanying excellent ecological indicators, for Moscow and the other cities which have networks of gas filling stations. Meanwhile, we need to pay attention to still another aspect of this problem.

The more compact forms of fuel, which have no need for large, heavy containers for on-board storage, must be used primarily for transport vehicles where the mass, fuel distance endurance and economy, all other conditions being the same, remain the main criteria determining the technical level as well as quality. In point of fact, one liter of gasoline contains energy equal to 69 liters of natural gas condensed to 12 atmospheres, or 4 liters, when the gas is condensed to 200 atmospheres. Meanwhile, the boilers of a TETs [Heat and Electric Power Station] or other stationary installations burn an equivalent amount of petroleum products as are consumed by all forms of surface, air and water transport equipment in the country. By sharply curtailing the use of scarce raw materials for boiler fuel and by increasing the yield of light fractions from petroleum through more thorough refining (this indicator is lower for us than for a number of industrially developed countries), we could greatly increase our volumes of motor fuel and improve the structure of our country's fuel-energy balance. The more widespread use of natural gas and gas condensate as raw material for the chemical industry, instead of some constituent of gasoline or the aromatic hydrocarbons, could become still another resource.

These are some of the directions which are making it possible to stabilize the demand for petroleum products and at the same time to maintain the tendency for intensive development of motor vehicle transport. One of the most complicated of the overall complex of efforts has fallen to the lot of the motor vehicle builders. The sector's collectives are faced with putting new capacities into production and redesigning operating production facilities.

The enterprises' institutes and engineering services are faced with immense problems in the area of improving diesel engine designs.

The process of dieselization demands a sharp upsurge in overall production standards, disciplined deliveries, improvements in the quality of materials and stock parts, re-examinations of a number of standards, strengthening the control system on new metrological principles, and an overall qualitatively new attitude to the business at hand.

These are the sort of demands with which workers in allied fields are faced. As a rule, engines which are economical run at higher operating temperatures, pressures and loads, and are, for this reason, extremely sensitive to the quality of the fuels and lubricants used in them, particularly the motor oils. The difference in the service life between operation on better and unsatisfactory oils is not determined by percentage points, but by a ratio. Meanwhile up to 45 percent of the oils delivered in the national economy have deteriorated.

It is critical as well to provide the engine-building industry with completely automated production lines and manufacturing equipment. Unfortunately, a major portion of the equipment we need is still imported and is for the most part sent off to set up new capacities.

And so it is that the dieselization program demands the stirring up of not only the efforts of the motor vehicle builders, who are most responsible for its successful resolution, but it demands the motivated participation of many of the industry's sectors.

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LOWER-COST FUEL FOR DIESEL ENGINES APPROVED

Moscow PRAVDA in Russian 14 Jul 85 p 6

[Article by V. Ovechkin in Tashkent: "Right from the Well"]

[Text] Gas-condensate fuel--that is what they call the new type of diesel engine fuel developed by scientists at the the Tashkent Highways Institute. This innovation is cheaper by a third than the existing kinds of fuels, and the toxicity of the exhausts has been reduced significantly.

After carefully testing the properties of the fuel a state interdepartmental commission at Gosstandart USSR granted permission to introduce the new fuel. It is finding use in vehicles with diesel engines as well as in stationary diesel engines in operation in the gas fields of Central Asia and in the remote, barely accessible regions thereabout.

The fuel is derived from a byproduct produced during gas extraction, the so-called condensate, which in its outward form looks and smells like gasoline. At a great many gas fields they simply burn off the condensate.

Over the course of several years, scientists at the Tashkent Highways Institute have been searching for such a means of making use of the gas condensate--one which would permit utilizing this byproduct without large material expenditures and put it to the use of the national economy. Such a means has been found.

The scientists discovered that if the gas condensate is mixed with certain proportions of common diesel fuel, a splendid fuel is produced, which in many ways is superior to the ordinary diesel oil.

However, the gas condensates at various gas fields differ from one another in their composition. But the scientsts of Tashkent have worked out a special methodology to define the volumes of the component parts of the new fuel with precision. As a result, it is possible to derive a fuel with stable properties from any condensates. The Tashkent scientists received assistance from specialists from Moscow scientific-research institutes, and from their colleagues in Omsk, Ukhta and other cities.

It is now possible to fill the tanks of diesel engines with the new fuel right at the gas works.

"The splendid operating properties of the innovation are explained by their makeup," says E. V. Pyadichev, docent at the Tashkent Highways Institute. "The light fractions promote better burning of the fuel in the combustion chambers."

9006
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MOTOR VEHICLES AND HIGHWAYS

OFFICIAL ON CONTINUING VEHICLE SPARE PARTS PROBLEMS

Moscow AVTOMOBILNAYA PROMYSHLENNOST in Russian No 8, Aug 85 pp 23-25

[Interview with Ivan Petrovich Petrenko, chief engineer and first deputy director of the Avtotekhobsluzhivaniye [Motor Vehicle Maintenance] VPO [All-Union Industrial Association] by P. P. Razumov, from AVTOMOBILNAYA PROMYSHLENNOST; date and place not specified]

[Text] During the 11th Five-Year Plan period our country's system of car-care centers has continued to grow and improve. The number of company-sponsored motor vehicle centers and maintenance stations is growing, and the work done at these centers continues to be better organized. Nevertheless, as indicated by the letters sent to the editorial board, these facilities are a long way from satisfying the demand. In particular, there are a great number of complaints about the quality of, and the length of time taken to complete motor vehicle repairs.

In order to shed some light on the steps being taken by the Avtotekhobsluzhivaniye VPO to resolve the problems touched on by the authors of the above-mentioned letters, the editorial board met with Ivan Petrovich Petrenko, first deputy director and chief engineer of the VPO.

[Question] Ivan Petrovich, our system of car-care centers has been in existence for over ten years now. This is a long time, and has apparently been enough to gain experience and to discover the best possible procedures for organizing car-care operations, and not only to detect any flaws but to eliminate them as well. However, there has been no slackening in the unfavorable criticism directed at the work done by the enterprises servicing passenger cars. Is there any hope for an improvement in affairs?

[Answer] Yes, there is still a lot of unfavorable criticism. And the people who have written letters are correctly enumerating the shortcomings: neglect in organization and education, and in the grading, placement and training of the work force; and the production base, which does not always meet present-day requirements. But especially the shortage of certain spare parts at many of the STO's [maintenance stations].

However, I want to say right now that the measures needed to straighten out the car-care system--and I underscore car-care as an individual system--are being taken. A great deal has been said about them in the press, so I won't bother repeating it. But this business, as you well know, is complex, and requires both time and assets. But even now one can say that this matter has begun to receive a great deal more attention. Obviously you have noticed this in your letters to the editor.

[Question] That's right. If the car-care service customers used to be dissatisfied with practically all aspects of the work being done, then lately the main problem they write to us about has become the duration and quality of the repair work done on their cars, and this is mostly connected with the shortage in spare parts. The problem has special interest for long-term passenger car owners, or those whose cars have met with mishaps. What do you have to pass on to our readers in this regard?

[Answer] The problem of the scarcity of spare parts for privately-owned passenger cars is presently being resolved in a number of directions. First of all, production of parts is being stepped up by Minavtoprom [Ministry of the Automotive Industry] allied industrial plants. Quota plans for these parts have been made fairly intense, but they are fulfilling them, as the work totals for the first half of 1985 show, successfully overall. The second direction consists in organizing their production (as goods to meet the national demand) in ministerial and departmental enterprises which are not directly associated with manufacturing cooperation with Minavtoprom enterprises, i.e., Minmash [Ministry of Machine Building], Minobshcheprom [possibly Ministry of General Industry], Minaviaprom [Ministry of the Aviation Industry] etc. They have already set up production of a number of parts and assemblies, of long-scarce parts such as shock absorbers, and others, and R60 million of these parts will have been manufactured in 1985. True, the capacities for spare parts production at these ministries' plants are still inadequate, and that is why the production plans are underfulfilled. But a good start has been made.

From our point of view the idea of setting up a clear-cut system for distributing and monitoring reserves of spare parts, which takes the real needs of the regions into consideration, is very important.

[Question] With regard to this question, Ivan Petrovich, the editorial board is publishing an article prepared by the director of the Avtotekhobsluzhivaniye VPO, Yu. A. Maksimov along with specialists from a NAMI [Central Motor Vehicle and Engine Scientific Research Institute] affiliate.

[Answer] I know about this, and that's why I am limiting myself to only what I've already said. Now I'd like to turn to another direction for Minavtoprom and the VPO's efforts, which, it seems to me, should be of interest to your journal's readership. I'm thinking of the restoration, on a mass scale, of motor vehicle parts which have worn out and broken down for different reasons, and the idea of using them as spare parts.

[Question] This was suggested quite a while ago. However, judging by our letters, and by the personal observations of some of the staff, it is still a long way from being implemented.

[Answer] I cannot fully concur with that statement. For example, the enterprises of our VPO and of the AvtoVAZtekhobsluzhivaniye [Volga Automotive Plant Maintenance] system are already experienced in rebuilding camshafts, steering linkages, front suspension joints, valve gear levers etc. Documents are now being prepared on the subject of rebuilding similar parts for Moskvich and Zaporozhets cars, and soon appropriate procedures will be developed for use in rebuilding operations in plants and service stations. Of course, in organizational terms these efforts are essentially an experiment, and had no legal basis. A system like this has already been developed and legalized by the "Statute Concerning a System Using the Population to Receive and Estimating Parts, Assemblies and Units Subject to Rebuilding and Use in the Repair of Passenger Cars". This was put into effect in August 1984.

[Question] That means the new system has been operative for almost a year. But the car buffs, again, if one is to judge by the letters coming to the editorial board, only know about it by hearsay. Could you tell us about the gist of the system?

[Answer] Certainly. The new system is simple, and takes into account the interests of motor vehicle owners (these first of all), as well as the car-care enterprises. And, in brief, can be reduced to receiving passenger car units, assemblies and parts which have broken down and which need to be rebuilt. These include vehicle bodies, their blocks and detachable parts and their renovation and sale via the maintenance stations. The Ministry of the Automotive Industry has taken over all these operations and carries them out at the enterprises under its jurisdiction--the motor vehicle plants, repair plants, motor vehicle centers, maintenance stations etc. As concerns the car buffs being poorly informed, the efforts made in this area have been incomplete, including those made on the part of the car-care enterprises, as well as on the part of the mass information media. This situation needs to be corrected.

[Question] Ivan Petrovich, we would like to have further information regarding something you said. For example, you use the words "...[parts] that need to be rebuilt." Is this to be understood as meaning only those structural elements, the renovative processes for which are developed at a given moment, or generally everything which, according to its technical condition is suitable for this purpose?

[Answer] Definitely the second of the two. The maintenance stations are supposed to take in all the parts and items which are in good enough condition to be rebuilt. The only exceptions are the parts that have been renovated or overhauled by the car buffs themselves, using methods which would preclude the parts' being rebuilt by our specialized procedures. Nor could we accept assemblies or units which had been disassembled, or numbered parts, if the person turning them in has no proof of ownership, or if the serial numbers have been obliterated.

[Question] Please clarify something for us concerning motor vehicle bodies. It's common knowledge that car owners have been known to turn in the body of his car, usually in the wake of a serious accident, when the concept of the unit's "integrity" is often, and here we will speak bluntly, perceived as "relatively complete". Does this mean such a body won't be accepted?

[Answer] The technical requirements for acceptance of bodies provides for the fact that in cases where the bodies cannot be repaired, the maintenance station can accept those elements which can be repaired. This refers in the main to removable parts (i.e. attached to the body with reusable mounting hardware), and to blocks of body parts (for VAZ, GAZ and Moskvich vehicles, of such blocks which comply with the NAMI affiliate proposal which calls for 12 parts from each of these vehicles, and 10 from Zaporozhets vehicles).

[Question] Where, by whom and how are the acceptance and evaluative procedures carried out for parts which have worn out or have become inoperable due to other causes?

[Answer] As I have already said: by and at the maintenance stations. True, not all the maintenance stations have this right. A list of them for each region is approved by a higher organization, but one can have a comprehensive consultation concerning this question at any maintenance. As regards "by whom" and "how?", this is all regulated as well. Thus, at each maintenance station which has been charged with collecting out-of-order motor vehicle items, people are appointed by order of the chief to check the condition of all parts which are turned in and to evaluate them in the presence of the owner. In particular, regarding the acceptance of bodies and body units we appoint a commission of no less than three persons, and in all other cases one or two specialists. A legal document is drawn up according to the results of the inspection and evaluation of the parts. It is signed by the commission members, the vehicle's owner and is approved by the maintenance station chief.

[Question] Does this arouse unfavorable criticism and accusations of subjectivism in the evaluation of the value of the parts turned in and, speaking frankly, does it not engender abuses by the maintenance station workers?

[Answer] Not very likely, since the going purchase prices are common knowledge. The price for replacement parts for bodies are set at 10 percent of the retail price for a corresponding new part, and are set at 30 percent of the price for body and body component parts. Body parts which cannot be repaired are taken for the price of their scrap metal.

[Question] What are the selling prices for rebuilt parts, assemblies and so on?

[Answer] For the body parts we remove, the prices come to 80 percent of the going retail price for their new counterparts, and 70 percent for bodies and their components.

[Question] A person turns in some out-of-order parts from his car. Is it to his advantage, since he has the right , to accept similar, though repaired, parts in exchange, and if so, then which--new or guaranteed rebuilt parts?

[Answer] Yes, this right has been provided, and the parts can be either new, or rebuilt. But I want to mention that in both cases the part has to be installed on the car by maintenance station personnel, and when using a renovated part, this is done with the consent of the car's owner.

[Question] Our readers report in their letters that when car owners are replacing inoperable parts from their cars, the maintenance station workers insist that they turn in these parts. Is this demand legal?

[Answer] If repair enterprises are to rebuild parts of any sort, first they have to have them. This is precisely the reason for the practice, as well as to rule out cases where parts and units are acquired for stock or for other reasons, and a decision is made, in accordance with which the spare body parts are sold by the maintenance station only after the parts which had been broken are shown. And if the part (assembly or whatever) which is brought out is considered unsuitable for repair, then this is no basis for refusing to replace it on the vehicle.

[Question] Some people are of the opinion that rebuilt parts are less operationally reliable than new parts. What's more, these people hold that it is a bad idea economically for a car owner to use rebuilt parts. Is this right?

[Answer] If these opinions do in fact exist, they are clearly erroneous. I already said that all parts are rebuilt according to specifications developed by the producer plants, which produce our new motor vehicle equipment and parts. That is why the operating parameters and the technical features (except for service life and mass) of rebuilt parts have to correspond fully to like indicators for new parts. All this is guaranteed by virtue of coordinated repair procedures, tests and monitoring, as well as by the replacement of all the elements which wear out rapidly (paper and cardboard liners, oil seals etc.) with new ones. Responsibility for the quality of rebuilt parts is borne by the appropriate enterprises (whether plant or maintenance station). As concerns the economic side of the affair, a simple calculation shows that rebuilt parts are suitable for use by car owners. In fact, the service life of the very same rebuilt body element corresponds to the technical requirements, and comes to no less than 80 percent of the service life of a new element, and the price for the majority of these elements is only 70 percent of the price for new ones.

[Question] Many passenger car owners have accumulated a large or small supply or worn-out parts or broken units which were exchanged long before the system of which we are speaking was adopted. Can they turn these items over to a maintenance station?

[Answer] The right of taking car parts, assemblies and units from the population for purposes of renovation or for use as scrap metal, but not in exchange for new parts at maintenance stations, has been granted. Here the maintenance station will pay the cost for parts accepted for rebuilding, i.e., as was mentioned above, 10 or 30 percent of the cost of new parts, and for parts taken for scrap metal--current scrap metal prices are paid.

[Question] On behalf of the readers of this journal, we thank your for your informative talk. It has without doubt shed a lot of light on things, and perhaps has to some degree set right the mutual understanding between car-care enterprises and those who avail themselves of the services. But in conclusion, a final question: how long before we have a final solution to the spare parts problem?

[Answer] The time needed for this, of course, has been worked out. For example, as a result of the measures I enumerated at the beginning of our conversation, the problem of camshafts and spiders for VAZ motor vehicles is becoming much less acute already during this year (right now, according to the maintenance station registers these parts are being replaced every one or two months), and some parts are no longer scarce for the most part (air filters, for example). With regard to completely satisfying the demand for spare parts, according to the plans, this ought to be achieved by the middle of the 12th Five-Year Plan period.

12659
CSO: 1829/017

MOTOR VEHICLES AND HIGHWAYS

ROKSKIY HIGHWAY TUNNEL CONSTRUCTION PROGRESS

Tbilisi ZARYA VOSTOKA in Russian 10 Jul 85 p 1

[Excerpts] GRUZINFORM--Work traffic has started through the Rokskiy Tunnel, which, when it is put into operation, will allow round-the-clock motor vehicle traffic in the pass.

From Dzhava to the Rokskiy Tunnel, at an altitude of 2100 meters above sea level, it is impossible to get lost. The way to the pass is marked out by a gray ribbon of highway. This is a well built route, if one does not consider the three- to four-kilometer detour which, however, is fully passable for passenger cars.

The road is not tiring. On the contrary, the colorful landscapes have a calming effect. One does not want to hurry. There are inviting coniferous forests in the gorges, and higher up is the green velvet of alpine meadows. Quiet, cool...

"Go 3.7 kilometers through the tunnel, and you are in North Osetia, in the territory of the RSFSR," said the shift foreman of Tbiltonnel'stroy tunnel brigade No. 13, G. Gassiyev. "The tunnel is practically ready. On the southern sector (the tunnel is being built simultaneously from the north) all that is left is to cement approximately 150 running meters of tunnel and complete construction of a 15-meter gallery. There is still work to be done in a ventilation shaft as well. But these are just minor things."

"We are having problems with the supply of construction materials," says sector chief B. Gachechiladze, an engineer from Zestafoni whom we found at the site's main headquarters--the village of Zemo Roka. "If not for that we would turn over the tunnel and all the other structures to the users by the end of the year."

The reduction in staff here also testifies to the fact that the Transcaucasus Motor Vehicle Route that was stipulated by resolutions of the 26th CPSU Congress is nearing completion. The task force of 20 men has already been reassigned to another high-priority site--the Arkhotskiy Tunnel on the Caucasus Pass Railroad.

What are the advantages of the new route from the Transcaucasus to the RSFSR? For example, drivers from eastern Georgia who are using the Voyenno-Gruzinskiy Road in the spring and autumn months will gain nothing in distance. But the Krestovyy Pass is closed in the winter. When the Transcaucasus Highway is opened seasonal considerations will cease to matter--the route through the Rokskiy Pass will serve transport year round.

12461
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MOTOR VEHICLES AND HIGHWAYS

ASPHALT ROADS PLANNED FOR PERM OBLAST TAIGA

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 19 Jun 85 p 2

[Article by G. Bazhutin in Perm: "Through the Taiga on Asphalt"]

[Text] A vast road construction program has begun to be implemented in the northern Taiga zone of the Kama basin. A major asphalt road has been built in the city of Krasnovishersk. Now its products are being delivered not only to the road-building and repair administration, but to the lumbering enterprises as well, where special road-building detachments have been created.

Through their common efforts, the first kilometers of asphalt roads are being laid through the Taiga. They connect the timber industry and logging camps with the city and with the main raw material consumer here--the Vishersk Pulp and Paper Mill.

Of course, it's no simple matter to put down an asphalt highway in the severe conditions of the trackless forests. However, in the estimation of the specialists, the large expenditures will begin to pay off right away; after all, reliable roads will permit significant reduction in shipping costs, and will ensure the Vishersk Pulp and Paper Mill a steady supply of raw materials. And it will be possible to supply the consumers with its product--high quality paper--rapidly, and without losses. Reliable roads will also permit solving many social problems in this region, permitting more rapid development of the Taiga settlements.

In cooperation with scientists at the Perm Polytechnical Institute, the road builders are developing a new technology for laying asphalt in below-zero temperatures. They plan to test the "commercial qualities" of a new machine on the roads of Vishersk, one which is has an aircraft-type turbine that can heat up and dry out the roadbed.

9006
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RSFSR HIGHWAYS MINISTRY SCORED FOR ROADBUILDING EFFORTS

Moscow IZVESTIYA in Russian 23 Jul 85 p 2

[Article by IZVESTIYA Special Correspondent F. Seleznyev: "But the Accounts are in Order"]

[Text] The Presidium of the RSFSR Council of Ministers has discussed the question of the work of the republic Highways Ministry on accelerating scientific-technical progress in the branch.

Those taking part in the discussion took note of a trend which cannot but be disturbing--although RSFSR Minavtodorog [Highways Ministry] makes regular reports about successful completion of annual plans for construction and repair of hard-surfaced highways, in actuality the volume and rates of road-building remain unacceptably low. There are many reasons for the lag. And one of the main ones is that year in and year out the ministry has been submitting reduced plans for roadbuilding, and has been fulfilling them with ease. Things have gone so far that for the current year the assignment envisages putting into operation 16 km less roads than the year before.

Trying to justify ithemselves, ministry officials point chiefly to the lack of material-technical resources and in particular non-metallic materials and highly-productive machinery. It's true, there are difficulties; but there are also quite a few ways to overcome them. Take, for example, the enormous deposits of ashes around the thermal power plants, and waste materials from the rubber manufacturing and other branches of industry. Why can't the road-builders put these into use? In this very same Minavtodorog, there is a convincing example of a genuinely businesslike approach to making use of local building materials and industrial waste. The road-builders of the Kemerovo highways industrial administration demonstrated it in making use of soft stone for building materials, as well as ashes from thermal power plants and tailings from the production of coke.

The Irkutsk administration has approximately the same local resources for building materials. But its administrators did not take advantage of the experience of their colleagues in Kemerovo. Nor did many other industrial administrations.

Equipment capabilities are hardly being used. For example, highly-mechanized machinery of the Avtogreyd type, which are designed to lay solid concrete highways, are being used only at about one-third their capacity.

And excavaters, scrapers and bulldozers are being used a lot less than in 1980. More than one-third the operating time of this powerful machinery is spent standing idle for repairs. Is this not the reason for the downward curve in the yields on capital here?

Not much is being done to develop the industrial base of the highway facilities on a new technical basis. Last year a large amount of the resources allocated for these purposes was not assimilated. It is no accident that manual and hard physical labor is being reduced at an extremely low rate in the ministry's construction organizations. Toward the beginning of the current year the proportion of manual labor in the branch was over 37 per cent, as in the preceding years as well; and in the area of highway repair and maintenance it was over 50 per cent.

It would appear that the officials at the ministry ought to focus their attention on overall mechanization of labor-intensive processes, and on accelerating scientific-technical progress. The branch is served by a large contingent of scientific associates and project engineers. There are nearly 4,000 people at the main GiprodorNII [State Highway Project Planning and Surveying Scientific Research Institute] institute and its affiliates alone. However--petty projects, duplication and parallelism in research, and frittering away of resources and efforts are hindering the effective utilization of this potential. And all of this leads to unwarrentedly protracting the development of each topic.

In a word, the state of affairs in the branch turns out to be not quite so favorable as the minister, A. Nikolayev, tries to depict it. And this is why the Presidium of the republic Council of Ministers in its resolution pointed to the lack of a self-critical attitude of Minavtodorog officials toward the serious shortcomings in the operation of this department.

The Presidium has assigned the officials of the branch the task to ensure that roadbuilding proceeds at a higher pace, with better quality, and to improve highway repairs and maintenance at lower cost, in the 12th Five Year Plan.

9006
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RAIL SYSTEMS

DESIGN APPROVAL FOR ALMA-ATA METRO 1ST PHASE CONSTRUCTION

Moscow TRANSPROTNOYW STROITELSTVO in Russian No 6, Jun 85 p 62

[Text] The tunnel and subway section has analyzed and approved the plans for the Metrogiprotranson project for the building of the first approved phase of the subway in Alma-Ata, with the established projects decided upon to provide a fully developed line built 13,230 meters long with 11 stations.

The map of the Alma-Ata subway, planned to serve the most important passenger traffic locations such as the center of the city and to the peripheries, consists of three lines:

1. From avenue 50th Year of October to the western residential community:

2. From the Central Park of Culture imeni Gorky, to the center of the small community of Orbita mikrorayon:

3. From 50th Anniversary of October Avenue to Abay and beyond with an exit on Furmanov Street and on Lenin Prospekt. The total length of the line will be 40 kilometers.

The constructed length of the first part of the line with eight included stations is 7.66 kilometers, and with a spur to the depot it is 8.3 kilometers. The depot exists near the Oktyabrskaya station in the area of the Alma-Ata II railway station. The central part of the line with six stations (Dostyk, Almaly, Zhetyci, Kommunisticheskaya, Baykanur, Tulmar) will require a deep route. The end stations (Oktyabrskaya and Alatai) are designed to be shallow. All the stations will have long loading platforms and will provide for the accomodation of five rail cars.

The geological engineering conditions for the construction of the first line of the subway are complicated, but there is no water.

The sections of tunnel in the deep parts are supported with prefabrications made from factory-made reinforced concrete sections. For earthquake protection the sections are designed to be connected with ties stretched in circular patterns, in the manner of small stacked corners. Cast iron tubes lining the crossing tunnels are foreseen only in the sections entering near preexisting adjacent structures.

Out of six stations, two are columned and four are of a pylon type.

13099
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DEPUTY MARITIME FLEET MINISTER ON SECTOR MODERNIZATION

Moscow MORSKOY FLOT in Russian No 5, May 85 pp 41-44

[Article by B. Yunitsyn, deputy minister of the maritime fleet: "The Acceleration of Scientific-Technical Progress in the Sector"]

[Text] The party and the government give constant attention to the acceleration of scientific-technical progress--one of the decisive conditions of the increase in the efficiency of production and the improvement of the quality of products. This is fully relevant also to the activity of maritime transportation, although here, as with other types of transportation, there are some special features. In contrast to other spheres of material production, which turn out finished products, the production of transportation is the transfer of cargo. The expenditures connected with the transportation of cargo increase its cost, and as the result of the transfer the use value of goods is created or increased. As applied to transportation, the efficiency of production and the quality of products will be characterized by timeliness and the production cost of the transfer of cargo and by the preservation of its quality. And this, basically, depends on the technical means that are being used for the transport of Cargo. In addition, the technical means, above all of the ship, determine the organization and technology of the transfer of cargo and sometimes also its practical possibility. For this reason, the achievements of scientific-technical progress in maritime transport are manifested, above all, in the construction of ships.

If we set the task of accelerating scientific-technical progress, we must have criteria for the assessment of its level. The basic generalizing criterion of the technical level of a ship are the adduced expenditures per unit of production. What is meant by this, in so doing, is that the assigned terms for the delivery of the cargo, the preservation of its quality in comparable variants are secured. There are many more concrete criteria for the assessment of the technical level of a ship and its elements: The proportionate expenditure of fuel, reliability, service life, etc. But all of them, in the end, to one degree or another, determine the generalizing indicator--the adduced expenditures.

Scientific-technical progress is a continuous process. At the present time, the following are basic directions of scientific-technical progress in maritime transportation: The specialization of ships, the increase of their load carrying capacity, the development of power engineering for ships and the

economy of fuel and energy resources, the use of new materials in shipbuilding, the mechanization and automation of production processes, and the utilization of cosmic means of communication and navigation.

Every cargo, from the standpoint of loading, transportation and unloading, has its specific character and makes certain demands on the construction of the vessel. The transportation of some cargoes in specially constructed ships is always less expensive. But on the other hand, as a rule, the transportation of other cargoes in specialized ships is either impossible or connected with great difficulties. For this reason, specialized ships are built for the transportation of cargoes, the flows of which are sufficient and stable for their full utilization for their primary designation.

To the first specialized ships belong tankers and bulk cargo ships, which appeared on the seaways more than 100 years ago. Later specialized ships for the transportation of perishable cargoes and a variety of tankers, etc., began to be built. For the transportation of cargoes of a broad products list (container and piece goods, equipment, metal, and others) general-purpose vessels were and still are used now.

General-purpose ships with general cargoes spent about 60 percent of their operating time in ports in loading operations. With the growth of the volume of general cargoes, there was an increase in the total tonnage and number of general-purpose vessels. This led to the congestion of ports, to the increase of the lengths of stops in ports, and to the growth of stevedore expenditures. Of course, measures were taken to increase the intensity of loading operations during the remaking of general vessels: The vessels were equipped with well-developed cargo-handling gear, the maximum possible opening of decks was realized, and means of small-scale mechanization were introduced. All of this played a positive role, but it could not fundamentally change the state of affairs. The solution of the problem was found in the transportation of cargoes as enlarged pieces. Several variants of the enlargement of cargo pieces appeared: Containers, roll trailers, and lighters (as cargo units).

Naturally, special ships were needed for the transportation of cargo in enlarged pieces. And such ships were created. During the second half of the 1960's, cellular container carriers, ocean-going ro/ro ships and lighter carriers. These vessels were the basis of the corresponding transportation and technological systems. In every concrete case, the selection of one system or another was determined by the kind of cargo and the direction of its transportation.

The most progressive container system is where the cargo follows in the container from the sender to the receiver. But here it is necessary that the cargo, in terms of its characteristics, can be transported in a container and that all links of the transportation chain from the sender to the receiver are capable of processing containers. For a container system, special and expensive equipment and large port areas are required.

The system of the transportation of cargoes on ro/ro ships has proved to be more universal. On these ships, cargoes are successfully transported in containers, on roll trailers, in packages, on pallets, as well as equipment on

wheels and large-size equipment. For this system, too, large areas in ports are required, but one can manage with wharfs of smaller length and utilize some variants of loading and unloading of containers.

The lighter carrier system is most acceptable for the transportation of cargoes between ports with limited depths and regions with developed inland waterways.

During the past few years, an independent group of specialized ships for the transportation of heavy cargoes has developed. They can transport large-size pieces with a mass of several hundred tons. As a result, it has become possible to transport heavy equipment in assembled form, which reduces assembly work to a significant degree.

The creation and introduction of new transportation and technological systems for the transportation of general cargoes has made it possible to sharply increase the intensity of shipping operations and to reduce the stopping time of ships to 20-30 percent of the operating time.

The growth of the carrying capacity of ships leads to a reduction in the prime cost of cargo transportation if this does not call forth an increase in the stopping time. The question of increasing the intensiveness of shipping operations during the processing of liquid and bulk cargoes was resolved comparatively easily; for this reason the growth of carrying capacity was observed, above all, in the case of tankers and bulk carriers. But in this case, too, some difficult questions had to be solved. Shipbuilders had to create production possibilities for the construction of large-tonnage vessels and to learn to design and build such ships. In the ports, specialized cargo-transfer complexes with deep water wharfs had to be created.

The increase in the dimensions of ships and their carrying capacity has come to a stop for the time being. From the standpoint of the technology of shipbuilding, the possibilities are far from being fully exhausted. The carrying capacity of the ships being ordered at present is determined by commercial and operational considerations and by the maximum admissible draughts in terms of the depths in the straits, in approach channels and the water areas of ports.

One of the basic demands made of a main propulsion engine is economy. Thanks to its high economy, the internal combustion engine has become the basic type of ship engine. Its aggregate power reaches 36,78 megawatts (50,000 horsepowers) and makes it possible to complete practically any ships of the maritime fleet. Modern engines have a specific fuel expenditure of about 125 hectoliters of strain purity, moreover they can operate on fuel of very low quality.

At the present time, installations for the use of the heat of waste gases and cooling water, shaft generators, and waste-free systems of fuel preparation are being introduced on an increasingly wide basis. Among the fuel economy measures, one should also include the improvement of the propulsion qualities of the bodies of ships and propelling complexes--thanks to correctly selected geometric forms, the maintenance of the cleanness of surfaces, and the reduction of the nominal frequency of the revolution of screw propellers. Systems

for the optimization of fuel expenditure depending on the embarkation of the vessel are beginning to be applied on ships.

Recently there has been a renewal of interest in bituminous coal. However, for the time being coal can be used only in steam power plants, and their low efficiency factor and low calorific power make it necessary to have large reserves of bunker space on the ship. This leads to a loss of the capacity of the vessel. Problems also arise in regard to the storage and transportation of the coal, as well as difficulties with the mechanization and automation of its burning and the removal of wastes.

In regard to other types of transportation, the work of the maritime fleet has some distinctive features: The great duration of the voyages, the international character of the activity, and the limitation of the fuel reserves on board the ship. Taking this into account, one can propose that liquid fuel will be used on maritime vessels for a long time. Most likely coal will be used not in pure form, but as a product of distillation in synthetic fuel. True, already now there are examples of the construction of ships on the basis of coal heating for work on concrete lines.

Our domestic experience has shown the efficiency of the use of nuclear power on ships, where high independence and a high power to weight ratio are required. The increase in the prices for liquid fuel and the limited supplies of oil make the use of nuclear power on a large scale increasingly attractive on transportation vessels as well. As coastal practice and our experience have shown, the questions of safety here have been completely solved.

New materials are being introduced on an increasingly broad scale in shipbuilding. About 25 years ago, the hulls of ships began to be manufactured from low-alloyed steels. To protect them against corrosion, durable and long-lasting paint coats are used. Screw propellers are cast from stainless steel and special alloys. Lignum vitae is practically already no longer used for stern tube bearings. Various replacements for it have been found. For the most aggressive environments, pipes made of special alloys are used. Plastics are being introduced on a wide scale. Articles made from them are extensively used for the finishing of the interior premises. New materials are used for heat and electrical insulation. From the standpoint of materials, the most serious problem of shipbuilding is the struggle against the corrosion of the hull construction and pipelines.

During the past 15-20 years, a certain success has been attained in the sphere of automation. On ships that were built prior to the 1960's, means of automation were installed in limited volume: Regulators were put in for the maintenance of the constancy of the frequency of revolution of the prime movers to drive the generators for electric power; the operation of some ship systems and refrigeration equipment was automated; the main and auxiliary boilers were equipped with automatic burning and supply equipment; and instruments have been used for the remote measurement of pressures and levels of liquids. At first those processes were automated where manual control was impossible or automation was secured by a rather simple method.

At the beginning of the 1960's there is a growing interest in automation as a means of reducing labor expenditures for watch service. Many functions of control mechanisms, monitoring the parameters of working processes, signalization and sefety were automated. This made it possible to reduce labor expenditures for watch service and decrease the number of officers and crew or to use the freed sailors for the execution of technical maintenance work.

The performance of the watch in the engine room during operation by one person and maintenance without a watch during stopping have become the most widespread scheme of the organization of watch maintenance. There are ships on which the extent of automation makes it possible to carry out watch-less maintenance of power installations even during operation. The most labor-intensive processes of ship operations (the closing and opening of the hatches of cargo holds, the raising and lowering of boats, gangways, etc.) have been mechanized. The automation of the production processes on ships will continue to be developed in the future as well.

Ship crews expend much time on the control of the technical state of the elements of the ship. Means of technical diagnostics and non-destructive control can provide great assistance and economy of labor expenditures in this matter. This new direction in the perfection of technical operation must receive further development in the next few years.

Automation is being used on an increasingly broad scale in ship handling and navigation. Ships are being equipped with systems for the automatic radar plotting of their headings in crowded conditions and modern navigation systems automatically give out the coordinates of the ship. A large amount of work is being done on the introduction of satellite systems of communication and communication in navigation. There are grounds for suggesting that great changes will take place in communications technology during the next 15-20 years.

Enterprises and organizations of practically all industrial ministries are taking part in the creation of modern ships. Naturally, the chief role belongs to the Ministry of the Shipbuilding Industry. Among the other ministries, we should mention the Ministry of Heavy and Transport Machine Building, the Ministry of Ferrous Metallurgy, the Ministry of the Electrical Equipment Industry, the Ministry of Medium Machine Building, the Ministry of the Communications Equipment Industry, the Ministry of Instrument Making, Automation Equipment, and Control Systems, and others, whose achievements in the sphere of scientific-technical progress determine the technical level of modern maritime vessels. As a customer and consumer of the production of shipbuilding, the Ministry of the Maritime Fleet plays an important role in the acceleration of scientific-technical progress in the construction of ships. In formulating programs for the replenishment of the fleet, it is very important to correctly determine its structure and the types of ships. The effectiveness of the entire work of the Ministry of the Maritime Fleet will depend on this. Here a knowledge of the cargo traffic in the future is necessary. The greater the conformity of the structure of the fleet and the types of ships to the cargo traffic, the higher the efficiency of the utilization of every ton of carrying capacity. Unfortunately, there are still cases when general cargo has to be transported on timber carriers, and mass cargo--on general-purpose ships.

A high technical level can be envisaged in the basic technical operation requirements and technical specificiations for the construction of ships of the Ministry of the Maritime Fleet. However, the ministries supplying materials, mechanisms, equipment, instruments and apparatus are not always ready for this. For the mastery of the output of new types of products, time is required--including for experimental design work, and at times also for scientific research work. And the earlier such work unfolds, the more quickly the production of new types of articles will begin. This must be taken into account and one's work must be organized accordingly.

The Ministry of the Maritime Fleet (above all the All-Union Mortekhsudoremprom [not further identified] Association, the All-Union Marine Communications via Satellite Association, and the Central Scientific Research Institute of the Maritime Fleet), jointly with the ministries which are doing the supplying, must show initiative and persistence in the organization of the production of new and more perfect products in condensed periods of time.

In the formulation of tasks in regard to the output of new products guaranteeing the acceleration of scientific-technical progress in navigation and shipbuilding, one must take into account the results of basic science research, our own and world experience, the prospects of the creation of new and more perfect materials, mechanisms and apparatus, the state of affairs with fuel and energy resources and reserves of materials, the development of related types of transportation, etc.

Depending on the difficulty of the task that has been set, the number of executors in operation, and the necessary volume of capital investments, different organizational forms may be selected for its solution. The--in terms of their essence and from the standpoint of organization--most difficult tasks are solved through decrees of the government. If a large amount of scientific research and planning and design study are required with experienced workers, and if, moreover, the executors will be the organizations of many ministries and departments, then integrated goal-oriented programs will be put together under the general direction of the USSR State Committee for Science and Technology. More narrow and concrete questions are more frequently solved by means of the adoption of joint decisions by two or several ministries. It must be said that this rather effective and efficient form of accelerating the development and introduction of new technical solutions is often used in our practice.

But there are many questions connected with scientific-technical progress whose solution is found fully in the hands of the enterprises and organizations of the Ministry of the Maritime Fleet. The organization of the solution of such questions takes shape through the corresponding documents. They include plans for scientific research and experimental design work, plans for the introduction of new equipment and advanced technology. Such plans are composed at the level of the ministry, as well as by enterprises and organizations. Rather frequently plans for the organizational-technical measures concerning the solution of a concrete problem of one sort or another are developed. For example, concerning the economy of fuel and energy resources, the introduction of package and container shipments in this or that direction, the mechanization of plant and ship operations, etc.

A great deal of attention must be directed to the study, generalization and dissemination of progressive experience. On our ships, in steamship lines, in ports and in ship repair plants, there are many interesting and efficient technical solutions and developments, whose extensive and rapid introduction undoubtedly could produce a great economic effect.

The Ministry of the Maritime Fleet takes a direct part in the development of All-Union State Standards and technical conditions for articles that go for the complete equipment of shipbuilding and participates in the work of interdepartmental commissions for the acceptance of advance models of ship mechanisms and new materials. The competence and adherence to principles in the performance of this work increases the technical level of new shipbuilding.

Above, fundamental organizational forms for the solution of tasks in regard to the acceleration of scientific-technical progress in maritime transportation were shown. It is important, in good time, to raise question, select the correct organizational form for its solution, and to arrange control over its realization. And another important circumstance must be taken into consideration: The approach to the solution of large-dimension problems must be comprehensive. If we build specialized and large-tonnage vessels, we must simultaneously solve the problems of the creation of specialized complexes for their processing in ports and the technical possibility of repair in plants. The acceleration of scientific-technical progress in maritime transport must be embodied in concrete deeds and decisions.

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LASER BEACON OPERATING IN BERDYANSK PORT

Moscow MORSKOY FLOT in Russian No 5, May 85 p 36

[Article by V. Boyko, senior engineer: "Laser Sector Beam"]

[Text] In October 1984, after 2-year-long experimental operation, the state commission took into operation, in Berdyansk Port, a laser sector beam (LSM), which was developed and introduced in cooperation with specialists of the Odessa Higher Engineering Nautical School under the direction of professor A. Stafeyev.

The introduction of the laser sector beam reduced the expenditures for the construction of stationary navigation signals in the water during the reconstruction of the canal.

In connection with the lengthening of the channel from 12 to 20 kilometers, it became practically impossible to utilize alignment signals. The ruby-colored light of the laser sector beam is very well visible at such a distance. Thus, with a visibility of 4 kilometers, it is visible from 11 kilometers, but the alignment only from 2 kilometers.

The laser sector beam has 3 sectors: A central permanent light, which is aimed along the channel's axis, and two side lights with flashing and darkening characteristics. The navigator visually observes the light and easily detects the deviation of the ship to the right or to the left from the axis of the channel.

The laser sector beam is switched on from the premises of the port supervision from afar, on the request of the pilot or the captain of the ship. Control over its operation is realized by the shift captain of the port supervision (by means of a control starting device), as well as by the pilot (visually).

During ordinary conditions, one generator is operating, but an additional one is switched on during the deterioration of visibility.

The laser sector beam is also utilized during the execution of dredging operations and the control of the position and installation of buoys protecting the channel.

The introduction of the laser beam has increased the safety of navigation along the approach channel.

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